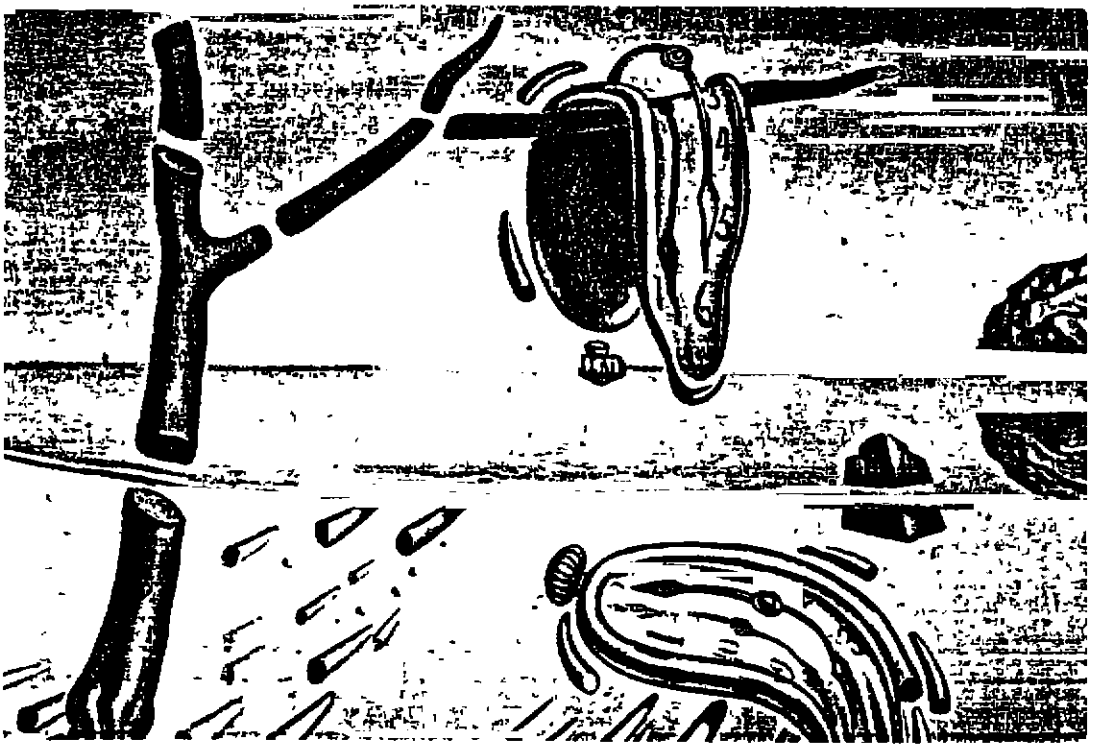
SHORTENING TIME TO THE DOCTORAL DEGREE



CALIFORNIA POSTSECONDARY EDUCATION COMMISSION

Summary

In 1989, the Legislature adopted Senate Concurrent Resolution 66 (Hart), directing the Commission to "determine whether there has been an increase in time to completion of doctoral degrees awarded by the University of California, and to study the factors which have led or may lead to an increase in time to completion of doctorates, and to make specific recommendation relative to methods of increasing the rate of progress toward receiving doctoral degrees awarded by the University without compromising the integrity of the academic process." This report responds to that request

The report outlines recent trends on attrition and time to the doctoral degree both nationally and at the University of California, as well as factors that appear to contribute to attrition and lengthy time to degree. However, it does not offer recommendations on how these trends might be reversed and these factors overcome

Rather than submitting recommendations in this report, the Commission will continue to study issues of time to degree and attrition as the University moves forward in its planning for graduate education. University officials have planned to present a new academic program plan for graduate education to the Regents late in 1990. As part of the Commission's review of that plan, the Commission will seek to undertake a more comprehensive and integrated discussion of graduate education, including issues of attrition and time to degree, than was possible before completion of the University's plan. By proceeding in this way, the Commission can address the interrelatedness of the problems of doctoral education within the framework of the University's own plan. When the Commission comments on the University's plan, if necessary it can offer specific recommendations on the broad variety of issues confronting graduate education, including attrition, time to degree, and diversification of the graduate student body and faculty

The Commission adopted this report at its meeting of December 10, 1990, on recommendation of its Policy Evaluation Committee. Additional copies of the report may be obtained from the Publications Office of the Commission at (916) 324-4991. Questions about the substance of the report may be directed to Kirk L. Knutsen of the Commissionstaff at (916) 322-8013.

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The cover: Salvador Dali, *The Persistence of Memory* (detail), 1948. From *Dali*, edited and arranged by Max Gerard. New York: Abrams, © 1968

SHORTENING TIME TO THE DOCTORAL DEGREE

A Report to the Legislature
and the University of California
in Response to Senate Concurrent Resolution 66
(Resolution Chapter 174, Statutes of 1989)

CALIFORNIA POSTSECONDARY EDUCATION COMMISSION
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CALIFORNIA POSTSECONDARY EDUCATION COMMISSION

COMMISSION REPORT 90-29
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1 *Background on the Report*

CALIFORNIA'S colleges and universities face numerous challenges

- Enrollment projections point toward a need for substantial growth in the coming years (California Postsecondary Education Commission, 1990a),
- The impending retirement of a large portion of the faculty will add to the need to recruit many new faculty members (The Commission, 1990b),
- The changing ethnic composition of the State's population requires that institutions accelerate their progress in facilitating the admission and academic success of historically underrepresented students (The Commission, 1990c),
- And ongoing budget limitations are forcing institutions to pursue these goals in an environment of declining resources (The Commission, 1990d)

Pressures on the University of California

Nowhere are these pressures more pronounced than in the doctoral programs of the University of California As the State's sole public education segment authorized to offer doctoral education, the University has recently proposed enrollment increases of 79 percent in its graduate programs through the year 2005 -- largely in order to address the projected need for additional faculty and increasing demand in the private sector for Ph D s, as well as to promote the University's goal of providing comprehensive and renowned graduate program offerings on each of its eight (soon to be nine) general campuses The precise level of graduate enrollment growth proposed may change somewhat when the University releases its new graduate enrollment plan in January 1991.

In addition, enrollment growth statewide and projected faculty turnover rates indicate that the University's doctoral programs must dramatically improve their ability to produce Ph D s from underrepresented backgrounds if the next generation of California faculty is to be more ethnically diverse than the past.

These goals would be difficult to accomplish under the best of conditions, but if California's deteriorating fiscal condition persists, the University may not be able to maintain its current graduate programs, much less expand to the level it has proposed To ensure that the State will be able to finance growth of graduate enrollment, the University must find ways to preserve educational quality, while simultaneously making its programs more efficient and more attractive to historically underrepresented students

National data indicate that total time to the doctoral degree has increased by 1 7 years over the past 20 years Not only has graduate education become less efficient nationally, but lengthening time to degree may be serving as a powerful disincentive for students generally and underrepresented students in particular to be pursuing graduate education at all

Origins of the report

Recognizing these trends, in 1989 Senator Gary Hart introduced and the Legislature adopted Senate Concurrent Resolution 66 (reproduced in Appendix A), directing the Commission "to determine whether there has been an increase in time to completion of doctoral degrees awarded by the University of California, and to study the factors which have led or may lead to an increase in time to completion of doctorates, and to make specific recommendations relative to methods of increasing the rate of progress toward receiving doctoral degrees awarded by the University without compromising the integrity of the academic process " ACR 66 also directed the Commission to recommend by Fall 1990 "methods of increasing the number of minorities and women awarded doctoral degrees of the University," including their undergraduate preparation, recruit-

ment, mentoring by faculty, retention or attrition, and career placement

The Commission worked closely with the University of California in exploring these issues Specifically, the Commission and the University sought to expedite the study as follows Commission staff sought to examine relevant national data and research surrounding the issues raised in SCR 66, while University staff in the Office of the President conducted a substantial amount of internal research into the University's own graduate programs This report relies on much of the data and analysis prepared by University staff and in places reproduces portions of that report for the purposes of the Commission's study Consequently, the Commission is appreciative to officials of the University for their cooperation and hard work in this effort For the University's perspective on these issues, readers should consult its report, *Factors Affecting Completion of Doctoral Degrees at the University of California* published in October 1990 by the Office of the President and reproduced in Appendix B below While the Commission does not necessarily concur with all of the conclusions and recommendations in the University's report, that document nonetheless contains a comprehensive examination of the questions raised by SCR 66

Definitions in the report

"Time to degree"

Time to degree is generally measured in three ways -- registered, elapsed, and total time

- *Registered time to degree* measures the actual time students spend enrolled in graduate school prior to receipt of the degree
- *Elapsed time to degree* measures the time from entry of graduate school until receipt of the degree It is thus generally longer than registered time because it includes time students may spend withdrawn from a program
- *Total time to degree* indicates the time from receipt of the bachelor's degree until receipt of the Ph D This is the longest of the three measures because, in addition to the time spent withdrawn from a doctoral program, it includes time between receipt of the bachelor's degree and entrance into graduate school

Unless otherwise indicated, "elapsed time" is the primary measure the Commission uses in this report

"Underrepresented students"

For purposes of this report, "underrepresented students" are considered to include women, Asian, Black, Latino, and Native American students The Commission includes Asian students because at the graduate level they remain underrepresented in certain disciplines In some cases, however, data on Asian students obscure analysis appropriately limited to those ethnic groups considered underrepresented at the undergraduate level -- Black, Latino, and Native American students In such cases, the Commission lists ethnicities individually or else uses the term "Non-Asian students from underrepresented backgrounds "

2 Conclusions

Length of time to the doctorate

1 *Average time to degree*

Average elapsed time to the doctorate at the University of California (time from entrance into graduate school until graduation) increased by 14 9 percent between 1968 and 1988, growing from 6 7 years in 1968 to 7 7 years in 1988 During the same period, the time students spent withdrawn from doctoral programs went down 0 3 years, meaning that the time doctoral students spend actually registered in graduate programs rose by 1 4 years

In 1988, the National Research Council found that graduate students throughout the country had been increasing their time to degree not only while registered in their graduate programs (as at the University) but also while *out* of school or *not* registered -- in contrast to the trend at the University, which has more strict policies regarding student withdrawl during doctoral study than the average American university

2 *Disciplinary differences*

Significant differences in average time to the doctorate have persisted over time between major fields of study, with engineering and computer sciences the lowest in 1988 at 6 3 years, followed by physical sciences (6.6 years), life sciences (7 1 years), social sciences (8 8 years), arts and humanities (10 3 years), and professional schools (10 4 years)

Increases in time to degree since 1968 have varied from 1 1 to 2 1 years, depending on discipline Engineering, the computer sciences, and professional schools have actually decreased time to degree over this twenty-year period.

3 *Ethnic/racial differences*

Differences exist in time to degree between ethnicities, but race/ethnicity does not appear to be the primary reason explaining these disparities Black, Latino, and Native American students average approximately one year longer than White students in the completion of their degrees, and across the different disciplines since 1978 they have experienced an increase in average time to degree of between 0 8 and 1 8 years (0 9 years on average) However, these students tend to be clustered in disciplines with higher times to degree than other students When looking at individual disciplines, the difference in average time to degree between White and underrepresented students from non-Asian backgrounds drops to approximately 0 5 years

Asian students and White students have experienced roughly the same increase in time to degree (0 5 years) since 1978, although Asian students overall finish their degrees faster than White students (7 4 years compared to 8 0 years) This shorter time to degree for Asian students appears to be largely the result of Asian clustering in disciplines which have shorter times to degree, although compared to White students, they take less time to complete degrees in the professional fields (1 4 years) and in engineering (0 4 years), and more time to complete degrees in the arts and humanities (0 4 years)

4 *Gender differences*

Average time to degree for women in 1988 was 1 year longer than for men (8.4 years compared to 7 4), although the increase for women since 1968 was lower (0 5 years) compared to men (0 9 years) The clustering of women in disciplines with long time to degree also appears to be the major factor explaining these differences

5 *Overall differences*

These observations lead the Commission to conclude that while disparities in time to degree that correlate to gender and/or race/ethnicity need to be addressed, the major cause for increases and differences in time to degree can be traced to other factors

-- (1) institutional policies and practices, (2) differences among individual disciplines, and (3) the changing characteristics and circumstances of the student body as a whole.

On the other hand, the data that are available indicate that persistent differences in attrition rates exist by ethnicity and that the reasons underlying these differences vary substantially by ethnicity

Factors causing longer time to degree

As will become evident, the issues of long time to the degree and differential attrition rates are complex and related to all aspects of student and institutional life The University of California did not decide to have longer time to degree, it just happened The fact that it happened in doctoral granting institutions nationally suggests that it is likely not caused by either University or State policies, but rather is a function of graduate education's discipline-based research tradition

The Commission's review of the national literature tends to confirm that observation Available research indicates that there are numerous factors that all contribute to attrition and long time to degree, including support and encouragement from faculty, relations with fellow students, financial aid, curriculum and degree requirements, housing, support services, and the academic job market -- to name a few

In the end, success in improving doctoral productivity will require addressing certain structural and financial barriers that impede degree progress, such as lack of student financial support, but more important it will require the changing of attitudes and expectations. Students must be simultaneously supported and prodded into maintaining timely progress, and faculty must be encouraged to reach out and aggressively support their students in achieving their goals Faculty must also be encouraged to critically evaluate their own programs, in order to identify ways in which the doctoral process might be streamlined. Students and faculty alike must come to expect timely progress and completion, and must incorporate this expectation into their assessment of the quality of the program

To suggest coherent ways in which this environment might be encouraged within the scope of a specifically defined study is difficult since such a strategy necessarily involves the integration of discussions on a wide range of subjects, all related one way or another to institutional finance, planning, quality, and productivity However, to avoid such integration ultimately risks fragmentation and piecemeal approaches to issues that are truly related and interdependent

The University of California is in the final stages of preparing a revised graduate education plan for its graduate programs That plan will be presented to the Regents in January 1991 and will then be available to the Commission for comment and analysis As part of the review of that document, the Commission will seek to address itself to a more comprehensive and integrated discussion of graduate education, including issues of time to degree, than is possible here As a result, conclusions but no recommendations are included in this study

The following paragraphs outline the Commission's major findings emerging from the review of the national literature on the primary causes of attrition and the current amount of time it takes to complete the doctorate, but due to the interrelatedness of the issues involving graduate education, it is the Commission's belief that its recommendations on time to degree and attrition should be expressed as part of its broader response to the University of California's graduate enrollment plan

1 *General communication, outreach, and recruitment*

A major challenge in increasing the proportion of women and underrepresented students in doctoral programs, and subsequently diversifying the professoriate, is to interest more women and underrepresented students in the benefits of academic careers (California Postsecondary Education Commission, 1990b) It will be necessary to expand programs that encourage undergraduate and master's students from the University, the State University, and independent institutions to apply for admission into the University 's doctoral programs (Appendix B contains a thorough discussion of such programs already in place)

2 *Disciplinary targeting of recruitment and outreach*

Women and historically underrepresented students continue to be underrepresented in mathematics, sciences, and other fields Unless more students from these groups become interested in and prepared to enter these fields, it will be nearly impossible to substantially diversify the next generation of faculty in these disciplines (California Postsecondary Education Commission, 1990b). It will be necessary to expand programs which encourage women and students from underrepresented backgrounds to excel in science and mathematics and eventually to pursue careers in those fields (Appendix B, and California Postsecondary Education Commission 1990e).

3 *Effects of campus climate*

Available research indicates that "campus climate" is a contributing factor leading to attrition for women and underrepresented students in graduate programs (Duncan, 1976, Knutsen, 1987, California Postsecondary Education Commission, 1990c) Women and other graduate students from underrepresented backgrounds consistently report feeling that they are "on the fringes" of their departments They say that they sense that they have to prove that they belong in graduate school while other students are more readily accepted, and that they leave in part due to a lack of intellectual and emotional support from the faculty It is clear that these perceptions contribute to student attrition and lower levels of achievement among underrepresented students As progress continues in diversifying the graduate ranks (especially in those disciplines where women and ethnic students are most underrepresented, such as engineering and the physical sciences), faculty in those fields will be put in the position of serving as mentors and advisors to students from widely different backgrounds These are students with whom these faculty have rarely if ever had occasion to interact. It should not be surprising that this interaction is often difficult, awkward, and uncomfortable for students and faculty alike

4 *Programmatic issues*

Elapsed time to the doctorate has increased by approximately one year over the past 20 years and registered time has increased by 1 4 years By any measure, doctoral students are spending more time enrolled in graduate programs The time has increased most in those disciplines that have traditionally taken longer to complete the degree, most notably the humanities and social sciences Since women and historically underrepresented students have tended to cluster in these fields, they are more likely to take longer to complete their doctorates than are students in engineering and computer sciences, the life sciences, and the physical sciences

It will be necessary to examine carefully all doctoral programs, but particularly those in the humanities and social sciences, to identify initiatives and reforms that will preserve the quality of their degrees but also assist students in earning their degrees as expeditiously as possible This review should be led and controlled by the faculty itself, but should address at least the following issues

1 Identification of ways to improve the mentoring and advising of graduate students, especially those students who are underrepresented in a particular discipline,

2 Identification of ways to better integrate underrepresented students into the activities of their departments and academic disciplines,

3 A review of policies on teaching assistantships, to ensure that students are receiving adequate training in needed skills and exposure to teaching opportunities, and to ensure that these responsibilities are not excessive to the point that they inhibit timely progress toward students' degree objectives,

4 Consideration of approaches and initiatives that ensure that students have apprenticeship opportunities in research, particularly in those disciplines where few research assistantships are now available,

5 A review of course requirements to ensure that they are appropriate for the degree, but not burdensome to the point of unnecessarily slowing degree progress, and

6 A review of both the explicit and especially the unstated expectations of graduate student performance, and of practices for clearly communicating these expectations to students

5 *Student financial support and aid packaging*

The University's ability to assist doctoral students in the timely completion of their degrees is influenced by its ability to offer financial assistance and support to students. In order to improve the University's performance in retention and the timely completion of doctoral degrees by its students, adequate student financial support is needed

Graduate students generally, but especially women and historically underrepresented students, need comprehensive, yet flexible financial aid packages, targeted as to type of aid, depending on the stage of doctoral study These packages can greatly reduce the financial uncertainties currently plaguing many women and historically underrepresented students and would likely encourage higher persistence and more timely completion of degrees

6 *Housing and student support services*

Non-academic services, such as low cost and convenient housing and child care are critical to completion of doctoral degrees This is especially important for women and historically underrepresented students, since they are often older, married, and with more dependents than traditional doctoral students

3 Doctoral Enrollment and Degree Production

Changes in doctoral enrollment and degree production

Over the 12 years from 1976 to 1988, the enrollment of students aiming for Ph D. degrees in the University of California grew from 12,825 to 17,979 -- an increase of 40 percent During the same period, however, the number of doctoral degrees conferred rose from 2,068 to 2,297 -- an increase of only 11 percent. While some of this gap between growth in enrollment and degrees conferred may be explained by the lag time that exists between enrollment increases and degree production (due to the time it takes to earn a degree), these data still indicate a need to look closely at issues of productivity in graduate education

Among American citizens in the University of California's Ph.D programs, enrollment increased during this period by over 24 percent -- growing from 10,591 to 13,027 However, Ph D s conferred to this same group increased by only 5 5 percent -- rising from 1,714 to 1,808 Enrollment of foreign doctoral students increased by over 114 percent, moving from 2,234 to 4,798, while Ph D s conferred to foreign graduate students increased by 38 percent (Display 1 below)

Over the past 20 years, the number of doctoral degrees awarded by the University of California increased from 1,444 in 1968 to 2,295 in 1988 -- an increase of 59 percent The bulk of this increase occurred in the years from 1968 to 1978 (37 percent), with growth slowing between 1978 and 1988 to 16 percent This general pattern of growth is largely consistent with national trends (Display 2 page 8)

While growth in the number of doctorates has been strong at the University of California over the past 20 years, different fields of study have varied widely in degree production. There has been dramatic growth in fields such as engineering (136 percent), the arts and humanities (113 percent), the social sciences (61 percent), and the life sciences (63 per-

DISPLAY 1 *Ph D Program Enrollment and Degrees Conferred at the University of California by Citizenship Status, with Indexed Four-Year Percentage Growth, 1976 to 1988*

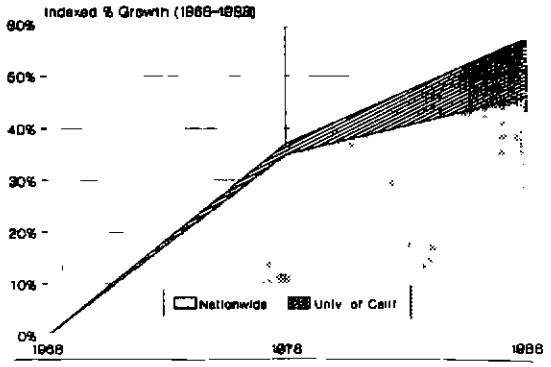
Ph D Enrollment	1976	1980	1976 to 1980 Percentage Change	1984	1976 to 1984 Percentage Change	1988	1976 to 1988 Percentage Change
Non-Resident Aliens	2,234	2,390	7%	3,592	61%	4,798	115%
U S Citizens and Permanent Residents	10,591	10,683	1%	11,045	4%	13,181	24%
Total	12,825	13,073	2%	14,637	14%	17,979	40%

Ph D Degrees Conferred	1976	1980	1976 to 1980 Percentage Change	1984	1976 to 1984 Percentage Change	1988	1976 to 1988 Percentage Change
Non-Resident Aliens	354	321	-9%	340	-4%	489	38%
U S Citizens and Permanent Residents	1,714	1,709	0%	1,724	1%	1,808	5%
Total	2,068	2,030	-2%	2,064	0%	2,297	11%

Note Data excludes students in professional schools, master's degree programs, and interns and residents

Source· California Postsecondary Education Commission IPEDS Data Base, 1976, 1980, 1984, and 1988

DISPLAY 2 Comparison of Nationwide and University of California Growth in Ph.D Degrees Conferred, 1968-1988, Indexed to 1968 Levels



Source National Research Council and Office of the President, University of California

cent) The least amount of growth was observed in the physical sciences (29 percent), and the professional fields actually experienced declines in degrees awarded (-8 percent) The decrease in the professional fields was due entirely to substantial decreases in the number of education degrees awarded (-26 percent) A more detailed breakdown in the variance in degree production between disciplines can be seen in Display 3 on the opposite page

Enrollment and degree production by gender and ethnicity

The national picture regarding graduate student diversification efforts is not encouraging From the late 1950s through the mid 1970s, the number of women and underrepresented students in graduate education nationwide increased substantially, but this growth has slowed or actually declined in the past decade For example, Displays 4 and 5 on pages 10-11 show that between 1978 and 1988, the number of American Black males receiving Ph D s dropped from 584 to 311, while the number of Latino male American citizens remained almost unchanged (317 to 321) and that of American Black women increased only slightly (449 to 494).

More disturbing still is the fact that in 1988, across the nation, only one Black and three Latino Americans received Ph D s in mathematics, only one Black and two Latino Americans received Ph D s in computer science, only three Black Americans received Ph D s in any foreign language, and only six Latino Americans received Ph D s in political science (Display 6, page 12) Finally, Asian students have made little progress in the humanities and social sciences Nationally in 1988, only four Asian students received Ph.D s in political science and international relations, one in communications, and five in any of the foreign languages

Clearly, the prospects nationally for replacing the current faculty with one that is more ethnically diverse are destined to fail if these trends are not reversed almost immediately (California Postsecondary Education Commission, 1990b)

At the University of California, the trends are mixed Women have experienced significant gains over the past 20 years in obtaining doctoral degrees. In 1968 they received 166 out of 1,260 degrees, or 13 percent of all doctorates conferred. By 1988 this figure had increased to 653 out of 2,083 degrees, or 31 percent of all doctorates conferred Overall, the number of women earning doctorates during this period increased 293 percent, while the number of men increased by 31 percent. Regardless of this overall improvement, women remain underrepresented in several disciplines In 1988 they received only 7 percent of all degrees in engineering, 18 percent of physical science degrees, and 37 percent of all degrees in the life sciences (Display 3, page 9 and Display 7, page 13)

The enrollment of Latino Ph D students at the University of California increased by 63 percent from 1980 to 1988, and degrees conferred to Latinos increased by over 65 percent While these increases are calculated from disappointingly low base numbers, that nine-year improvement was nevertheless substantial On the other hand, the enrollment of Black Ph D students reflected national trends and actually dropped by 2 3 percent between 1980 and 1988 Black women posted enrollment gains of 10.5 percent, but Black men suffered enrollment losses of 12 5 percent Doctoral degrees awarded by the University to Black students increased by 8 3 percent between 1980 and 1988, although those gains were exclusively the result of progress achieved between 1980 and 1984 Since that time, Ph.D s conferred to Black students have actually declined by

DISPLAY 3 *Gender and Major Field of Study of Doctorate Recipients at the University of California, with Percents and Percent Change, 1968, 1978, and 1988*

Student and Field	1968	Percent	1978	Percent	1988	Percent	Percent Change 1968-78	1978-88	1968-88
Men									
Arts and Humanities	99	9 0%	165	11 7%	149	10 4%	67%	-10%	51%
Engineering	145	13.3	214	15 2	341	23 8	48	59	135
Life Sciences	271	24 8	361	25 7	322	22 5	33	-11	19
Physical Sciences	309	28.2	338	24 1	356	24 9	9	5	15
Professional Fields	128	11 7	87	6 2	82	5 7	-32	-6	-36
Social Sciences	142	13 0	240	17 1	180	12 6	69	-25	27
All Fields	1,094	100 0	1,405	100 0	1,430	100 0	28	2	31
Women									
Arts and Humanities	32	19 3%	117	27 7%	146	22 4%	266%	25%	356%
Engineering	1	0 6	5	1 2	27	4 1	400	440	2,600
Life Sciences	44	26 5	115	27 2	193	29 6	161	68	339
Physical Sciences	14	8 4	35	8 3	79	12 1	150	126	464
Professional Fields	34	20 5	66	15 6	69	10 6	94	5	103
Social Sciences	41	24 7	85	20 1	139	21 3	107	64	239
All Fields	166	100 0	423	100 0	653	100 0	155	54	293
Total*									
Arts and Humanities	152	10 5%	299	15 1%	323	14 1%	97%	8%	113%
Engineering	170	11 8	249	12 6	402	17 5	46	61	136
Life Sciences	348	24 1	504	25 5	568	24 7	45	13	63
Physical Sciences	377	26 1	403	20 4	488	21 3	7	21	29
Professional Fields	182	12 6	170	8 6	167	7 3	-7	-2	-8
Social Sciences	215	14 9	350	17 7	347	15 1	63	-1	61
All Fields	1,444	100 0	1,975	100.0	2,295	100.0	37	16	59

* "Total" includes those for whom gender is unknown, therefore the numbers for men and women do not sum to the total

Source University of California-National Research Council Tapes, Table 1

17 percent (Display 6, page 12, and Display 8, page 14).

These data indicate that the University of California is sustaining progress in ethnically diversifying the graduate student ranks at rates substantially above the national average. Nevertheless, and despite this progress, at these rates the University will not produce adequate numbers of ethnically diverse Ph.D recipients to substantially diversify California's faculty ranks in the coming 15 years

Changes in degree distribution by field of study

The proportion of students earning doctoral degrees in engineering, life sciences, and physical sciences has not changed much at the University of California since 1968, with approximately 60 percent of all degrees awarded going to students in these fields In the remaining fields, fewer students earned doctoral degrees in professional fields in 1988 than in

DISPLAY 4 Female Ph D Recipients Nationally by Race/Ethnicity and Citizenship, 1978-1988

	Year of Doctorate										
Status	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Total	8,322	8,937	9,407	9,892	10,093	10,533	10,699	10,744	11,306	11,426	11,790
U S Citizen	7,355	7,884	8,346	8,701	8,829	9,239	9,297	9,146	9,448	9,410	9,505
Permanent Resident	292	306	319	308	313	322	332	325	365	461	453
Temporary Resident	455	495	490	553	583	627	698	834	861	887	4,056
American Indian	10	25	29	29	33	31	20	56	41	53	42
U S Citizen	10	25	29	29	33	31	20	56	41	53	42
Permanent Resident[1]	-	-	-	-	-	-	-	-	-	-	0
Temporary Resident[1]	-	-	-	-	-	-	-	-	-		0
Asian	422	444	470	488	549	582	614	697	687	777	933
U S Citizen	103	117	145	150	171	180	174	187	183	173	199
Permanent Resident	111	110	131	109	108	120	118	116	111	170	164
Temporary Resident	197	210	190	223	262	275	313	389	387	428	561
Black	481	547	574	567	615	549	591	589	564	516	560
U S. Citizen	449	505	533	514	564	509	526	533	501	450	494
Permanent Resident	8	6	11	17	15	10	21	14	20	21	25
Temporary Resident	18	32	26	33	33	24	37	41	38	44	40
Latino/Hispanic	211	222	229	274	270	334	297	355	390	378	367
U.S Citizen	156	154	156	189	191	251	222	261	269	286	273
Permanent Resident	13	25	25	15	27	24	24	23	36	41	34
Temporary Resident	38	38	48	68	47	54	48	67	83	50	59
White	6,579	7,022	7,494	7,891	8,082	8,523	5,628	8,417	8,811	8,822	8,971
U S Citizen	6,238	6,659	7,145	7,521	7,690	8,090	8,179	7,952	8,323	8,298	8,389
Permanent Resident	152	157	142	159	154	164	164	167	186	213	220
Temporary Resident	175	195	201	207	216	252	267	295	291	305	353
Unknown Ethnicity	619	677	611	643	544	514	549	630	813	880	917
U S Citizen	399	424	338	298	180	178	176	157	131	150	108
Permanent Resident	8	8	10	8	9	4	5	5	41	16	10
Temporary Resident	27	20	25	22	25	22	33	42	62	60	43

Note Totals for racial/ethnic groups include doctorates with unknown citizenship status.

1 In most cases, non-United States Native Americans are citizens of Canada or Latin American countries

Source Adapted from National Research Council, 1989, p 17

1968, and proportionally more students earned degrees in the arts and humanities (Display 3)

Changes in degree distribution by gender

In 1968, women received doctorates predominantly in life sciences (26 5 percent), social sciences (24 7

DISPLAY 5 Male Ph D Recipients Nationally by Race/Ethnicity and Citizenship, 1978 to 1988

Status	Year of Doctorate										
	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Total	22,553	22,302	21,613	21,465	21,013	20,747	20,633	20,547	20,590	20,941	21,666
U S Citizen	17,936	17,580	16,875	16,360	15,559	15,119	14,729	14,217	13,633	13,581	13,667
Permanent Resident	1,052	1,014	972	973	915	953	892	999	1,067	1,117	1,158
Temporary Resident	2,966	3,092	3,154	3,387	3,621	3,872	4,132	4,395	4,414	4,722	5,120
Native American	51	59	46	56	44	51	54	39	59	63	51
U S Citizen	50	56	46	56	44	50	54	39	58	62	51
Permanent Resident[1]	-	-	-	-	-	1	-	-	-	-	-
Temporary Resident[1]	1	3	-			-	-	-	1	1	-
Asian	1,972	2,158	2,151	2,223	2,355	2,542	2,780	2,945	3,041	3,349	3,838
U S Citizen	287	311	313	315	281	312	338	329	348	369	413
Permanent Resident	531	564	513	499	444	431	389	437	417	455	457
Temporary Resident	1,114	1,253	1,282	1,341	1,567	1,731	1,982	2,137	2,258	2,505	2,949
Black	903	898	871	924	911	833	903	851	706	701	686
U S Citizen	584	551	499	499	483	413	427	379	322	317	311
Permanent Resident	65	52	63	80	81	73	81	117	106	118	121
Temporary Resident	252	288	305	339	340	339	382	354	275	261	249
Latino/Hispanic	631	378	592	657	650	635	621	646	666	678	678
U.S Citizen	317	308	256	275	344	288	314	300	303	333	321
Permanent Resident	52	52	48	47	52	45	47	50	71	50	65
Temporary Resident	251	310	280	321	247	288	252	294	289	288	287
White	17,175	16,660	16,311	16,035	15,575	15,308	14,771	14,457	13,956	13,887	14,082
U S Citizen	15,573	15,261	14,848	14,459	13,987	13,609	13,170	12,805	12,303	12,172	12,296
Permanent Resident	379	319	326	331	309	381	350	367	410	441	448
Temporary Resident	1,197	1,068	1,130	1,225	1,242	1,287	1,226	1,272	1,214	1,258	1,323
Unknown Ethnicity	1,821	1,849	1,642	1,570	1,478	1,378	1,504	1,609	2,162	2,263	2,331
U S Citizen	1,125	1,093	913	756	420	447	426	365	299	328	275
Permanent Resident	25	27	22	16	29	22	25	28	63	53	67
Temporary Resident	151	170	157	161	225	227	290	338	377	409	312

Note: Totals for racial/ethnic groups include doctorates with unknown citizenship status

1 In most cases, non-U S American Indians are citizens of Canada or of Latin American countries

Source Adapted from National Research Council, 1989, p 16

percent), and professional fields (20 5 percent) By 1988, they continued to earn most of their degrees in life sciences (29 6 percent), but the proportion earning degrees in professional fields dropped substantially (from 20 5 percent to 10 6 percent) This drop in the professional fields was offset by proportional increases in all other fields except social sciences (Display 3) Overall, the number of women receiving degrees from 1968 to 1988 have increased in all fields, however, the absolute numbers remain

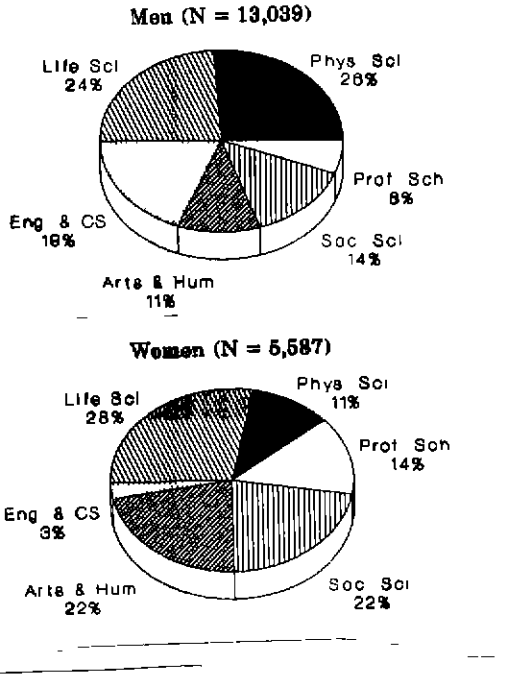
DISPLAY 6 *Race/Ethnicity and Sex of Ph D Recipients at the University of California, 1978-1989*

	Year of Doctorate											
Status	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Total	1,890	1,914	2,030	2,111	19,83	2,084	2,064	2,012	2,065	2,023	2,297	2,307
Men	1,458	1,444	1,496	1,093	1,404	1,463	1,431	1,363	1,375	1,385	1,584	1,534
Women	432	470	534	431	575	609	623	642	686	638	711	761
Native American	5	5	3	6	5	6	7	6	9	6	10	5
Men	4	2	2	4	4	3	7	2	4	3	6	2
Women	1	3	1	2	1	3	0	4	5	3	4	3
Asian/ Pacific Islander	58	57	83	79	100	117	126	126	118	113	136	157
Men	47	45	66	55	67	88	94	87	83	81	102	114
Women	11	12	17	24	33	29	32	39	35	32	34	43
Black	36	36	36	40	34	33	47	24	35	36	39	31
Men	22	25	20	18	19	17	29	12	16	21	20	14
Women	14	11	16	21	15	16	18	12	19	15	19	17
Filipino	2	0	0	2	3	2	2	3	1	3	3	4
Men	2	0	0	0	2	1	1	3	1	2	2	3
Women	0	0	0	2	1	1	1	0	0	1	1	1
Latino/Hispanic	27	27	41	19	45	45	49	49	59	55	68	60
Men	19	22	35	17	30	31	31	34	35	33	44	35
Women	8	5	6	2	15	14	18	15	24	22	24	25
White	1,232	1,150	1,245	954	1,102	1,239	1,238	1,206	1,214	1,191	1,341	1,284
Men	926	851	883	651	753	836	818	776	741	758	856	770
Women	306	299	362	303	349	403	420	430	473	433	485	514
Non-Resident Alien	313	285	321	246	300	359	340	354	411	400	489	540
Men	276	243	276	217	266	307	284	294	345	336	407	439
Women	37	42	45	29	34	52	56	60	66	64	82	101
No Response/ Other	217	354	301	765	394	283	255	244	218	219	211	226
Men	162	256	214	131	263	180	167	155	150	151	147	157
Women	55	98	87	48	127	91	78	82	64	68	62	57

Note Men and women may not always add to total due to some reporting of "unknown sex"

Source: HEGIS/IPEDS Datas Base, California Postsecondary Education Commission, 1978-1989

DISPLAY 7 Distribution of Doctoral Recipients at the University of California, by Discipline and Gender, 1980-1988



Source: National Research Council Survey of Earned Doctorates.

disappointingly low in fields such as engineering and physical sciences

In contrast, in 1968, men received their degrees mainly in the physical sciences, life sciences, and engineering This distribution has not changed much over time, except that by 1988 the proportion of men receiving degrees in engineering had increased from 13 3 percent to 23 8 percent The only significant decrease for men occurred in the professional fields, with the proportion earning doctorates declining from 11 7 percent to 5 7 percent

Changes in degree distribution by ethnicity

In the years 1980 to 1988, Asian students received their degrees predominantly in engineering, life sciences, and physical sciences; Black students received degrees predominantly in the social sciences and professional fields; Latino/Chicano students in life sciences and social sciences, and Native American students in life sciences, physical sciences, and social sciences In contrast, White students received most of their degrees in life sciences and physical sciences (Display 8, page 14, and Display 19, page 28)

Due to the small number of doctoral recipients from underrepresented backgrounds in past years, it is not possible to examine meaningfully the movement in students' discipline choices over time within each individual ethnicity However, it is known that since 1978, Asian students received proportionally more degrees in arts and humanities and engineering, offset by declines in life sciences and physical sciences Since 1978, Black, Latino, and Native American students collectively have obtained a larger proportion of degrees in the life sciences and physical sciences, offset by declines in social sciences and the professional fields

Characteristics of doctoral degree recipients

Age

Generally, women and students from underrepresented backgrounds at the University of California have been and continue to be older than their White male counterparts, even within individual disciplines (Display 9, page 15) This difference is caused in part by the marginally higher times to degree for underrepresented students within individual degree categories, but the average age differences between genders and ethnicities within individual disciplines are generally bigger than the differences in time to degree

Marital status

Fewer doctoral degree recipients reported themselves as married in 1988 (56 percent) than in 1968 (76 percent), although a portion of this decrease may be attributable to the large number of couples now living together who are not married Men are more likely to be married than are women (57 percent to 53 percent), and the variance in different disciplines ranged from a high of 70 percent in professional fields to 50 percent in physical sciences (Display 10, page 16)

DISPLAY 8 *Ethnicity of American Citizen and Permanent Resident Doctorate Recipients at the University of California by Field of Study, 1978 and 1988*

Status	Arts and Humanities	Engineering and Computer Sciences	Life Sciences	Physical Sciences	Professional School	Social Sciences	All Fields
1978							
Asian							
Number	3	29	31	25	8	7	103
Percent	2 9	28 2	30 1	24 3	7 8	6 8	100 0%
African American							
Number	3	1	7	6	4	12	33
Percent	9 1	3 0	21 2	182	12 1	36 4	100 0%
Native American							
Number	0	0	1	0	0	0	1
Percent	0 0	0 0	100 0	0 0	0 0	0 0	100 0%
Chicano/Latino							
Number	17	4	4	1	11	16	53
Percent	32 1	7 5	7 5	1 9	20 8	30 2	100 0%
White							
Number	239	109	376	287	107	244	1,362
Percent	17 5	8 0	27 6	21 1	7 9	17 9	100 0%
Non-Asian							
Minority Number	20	5	12	7	15	28	87
Total Percent	23 0	5 7	13 8	8 0	17 2	32 2	100 0%
Total Minority							
Number	23	34	43	32	23	35	190
Percent	12 1	17 9	22 6	16 8	12 1	18 4	100 0%
Total Domestic							
Number	278	149	438	341	144	304	1,654
Percent	16 8	9 0	26 5	20 6	8 7	18 4	100 0%
1988							
Asian							
Number	15	47	34	28	9	13	146
Percent	10 3	32 2	23 3	19 2	6.2	8 9	100 0%
African American							
Number	7	1	7	4	9	12	40
Percent	17 5	2 5	17 5	10 0	22 5	30 0	100 0%
Native American							
Number	3	0	1	3	0	2	9
Percent	33 3	0 0	11 1	33 3	0 0	22 2	100 0%
Chicano/Latino							
Number	17	5	19	13	8	17	79
Percent	21 5	6 3	24 1	16 5	10 1	21 5	100 0%
White							
Number	238	190	410	298	96	232	1,464
Percent	16 3	13 0	28 0	20 4	6 6	15 8	100 0%
Non-Asian							
Minority Number	27	6	27	20	17	31	128
Total Percent	21 1	4 7	21 1	15 6	13 3	24 2	100 0%
Total Minority							
Number	42	53	61	48	26	44	274
Percent	15.3	19 3	22 3	17 5	9 5	16 1	100 0%
Total Domestic							
Number	287	252	479	360	124	285	1,787
Percent	16.1	14 1	26 8	20 1	6 9	15 9	100 0%

Note Includes U S. citizens and permanent residents only (excludes foreign), "Total Domestic" includes those for whom ethnicity is unknown

Source University of California-National Research Council Tapes, Table 2

DISPLAY 9 Average Age of Doctorate Recipients, at the University of California at Degree Completion, by Field of Study, Sex, and Ethnicity 1968, 1978, and 1988

Field of Study and Year	Total[1]	Men[1]	Women[1]	White	Asian	African American	Chicano/ Latino
All Disciplines							
1968	32 3	31 9	34 3	N/A	N/A	N/A	N/A
1978	32 1	31 6	33 8	32 0	31 8	35 1	35 2
1988	33 3	32 6	34 6	33 3	32 5	37 3	34 1
Arts and Humanities							
1968	34 0	33 6	35 2	N/A	N/A	N/A	N/A
1978	34 0	33 3	35 1	33 8	31 0	37 0	35 9
1988	36 5	36 1	37 0	36 2	34.3	38 9	38 8
Engineering and Computer Science							
1968	31 6	31 6	31 0	N/A	N/A	N/A	N/A
1978	31 6	31 6	31 8	33 0	30 8	31 0[2]	31 8
1988	31 3	31 3	31 4	31 1	31 7	31 0[2]	31 8
Life Sciences							
1968	31 0	31 1	30 5	N/A	N/A	N/A	N/A
1978	30 9	30.7	31 7	30 5	32 3	35 9	32 5
1988	32 4	32.0	32 9	32 3	32 3	34 7	31 8
Physical Sciences							
1968	29 0	29.1	27 7	N/A	N/A	N/A	N/A
1978	29 8	29 7	30 4	29 6	30 4	32 5	28 0[2]
1988	30 9	30 9	31 0	30 6	31 4	32 5	30 7
Professional Schools							
1968	39 1	38 4	41 7	N/A	N/A	N/A	N/A
1978	36 8	36 7	36 9	36 9	37 4	38 0	38 2
1988	38 0	37 1	39 0	39 0	35 2	43 6	36 8
Social Sciences							
1968	33 0	32 7	34 0	N/A	N/A	N/A	N/A
1978	32 9	32 4	34 1	32 5	33 6	34 8	34 5
1988	35 0	34 8	35 3	35 2	35 0	35 4	34 2

Note: Figures for Native Americans are not displayed because only one Native American received a doctorate in 1978 and only nine Native Americans in total received doctorates in 1988.

1 The Total, Men, and Women columns include foreign and domestic recipients, and also include those for whom ethnicity/race is unknown

2 Number is based on only one case

Source University of California-National Research Council Tapes, Table 3-5

DISPLAY 10 Percent of University of California Doctorate Recipients Who Were Married, by Field of Study, Sex, and Ethnicity, 1968, 1978, and 1988

Field of Study and Year	Total[1]	Men[1]	Women[1]	White	Asian	African American	Chicano/ Latino
All Disciplines							
1968	76	79	58	N/A	N/A	N/A	N/A
1978	59	61	55	59	68	67	67
1988	56	57	53	55	60	45	57
Arts and Humanities							
1968	74	81	53	N/A	N/A	N/A	N/A
1978	59	58	60	57	100	100	69
1988	58	59	57	58	71	17	65
Engineering and Computer Sciences							
1968	82	82	100	N/A	N/A	N/A	N/A
1978	64	64	80	69	69	100[2]	50
1988	61	61	61	55	75	100[2]	80
Life Sciences							
1968	75	78	60	N/A	N/A	N/A	N/A
1978	60	63	49	60	69	57	25
1988	51	53	48	53	41	57	53
Physical Sciences							
1968	73	74	50	N/A	N/A	N/A	N/A
1978	52	52	50	51	52	83	100[2]
1988	50	50	49	50	41	75	43
Professional Schools							
1968	80	86	60	N/A	N/A	N/A	N/A
1978	77	84	69	79	75	75	72
1988	70	77	61	65	100	44	63
Social Sciences							
1968	75	80	58	N/A	N/A	N/A	N/A
1978	56	58	49	55	100	50	75
1988	56	60	52	57	58	36	56

Note Figures for American Indians are not displayed because only one Native American received a doctorate in 1978 and only nine Native Americans in total received doctorates in 1988

1 The Total, Men, and Women columns include foreign and domestic recipients, and also include those for whom race/ethnicity is unknown

2 Number is based on only one case

Source University of California-National Research Council Tapes Tables 3-5

Among students from underrepresented ethnic backgrounds, Asian students are the most likely to be married (60 percent), followed by Latinos (57 percent), Whites (55 percent), and Blacks (45 percent)

Dependents

Far fewer students reported dependents in 1988 than in 1968 (41percent to 72 percent), and in 1988 women reported dependents less often than men (29 percent to 46 percent) About two-thirds (67 percent) of all professional field students reported having one or more dependents, compared with 48 percent in engineering and computer science, 42 percent in arts and humanities, 39 percent in social sciences, and 34 percent in the physical sciences and life sciences (Display 11, page 18) It may be that the high rates of marriage and dependent responsibility among students in professional fields are related to the fact that these students are also the oldest and take the longest time to complete their studies In other words, students in professional fields may be taking extra time to graduate in part because of family responsibilities

The ethnic/racial differences in the percentage of students with dependents are large In 1988, Latino students were the ethnic group with the largest proportion having dependents (60 percent), followed by Asians (43 percent),Blacks (41 percent), and Whites (35 percent) (Appendix B).

Type of undergraduate school

In 1988, 50 percent of all the University's doctoral degree recipients (United States citizens and permanent residents) received their bachelor's degree from institutions outside California, 32 percent received their bachelor's degree from the University itself, 12 percent from the California State University, and 6 percent from one of California's independent institutions

No significant differences are evident by discipline as far as the location where the students obtained their bachelor's degrees, with the only exception being engineering, where the proportion of State University undergraduates dropped to 6 percent

Among students from different ethnic/racial backgrounds, large proportions from each background came from institutions outside California (43 percent of Chicano/Latinos, 45 percent of African-Americans, 50 percent of Whites, and 61 percent of Asians) Within California, students from each ethnicity most often got their bachelor's degrees from the University of California, with the exception of Black students, where 30 percent got their bachelor's degree from the California State University (Appendix B)

DISPLAY 11 Percent of University of California Doctorate Recipients with One or More Dependents, by Field of Study, 1968, 1878, and 1988

Field of Study and Year	Total[1]	Men[1]	Women[1]	White	Asian	African American	Chicano/ Latino
All Disciplines							
1968	72	80	19	N/A	N/A	N/A	N/A
1978	50	55	33	48	55	67	54
1988	41	46	29	35	43	41	60
Arts and Humanities							
1968	74	86	28	N/A	N/A	N/A	N/A
1978	42	45	37	41	0	100	31
1988	42	50	33	39	46	40	73
Engineering and Computer Science							
1968	85	86	0	N/A	N/A	N/A	N/A
1978	62	64	0	63	68	100[2]	25
1988	48	51	14	37	51	No Data	50
Life Sciences							
1968	71	79	11	N/A	N/A	N/A	N/A
1978	49	57	22	48	53	57	33
1988	34	41	22	31	38	33	50
Physical Sciences							
1968	69	71	17	N/A	N/A	N/A	N/A
1978	42	44	24	40	38	60	100[2]
1988	34	37	20	27	27	67	57
Professional Schools							
1968	76	88	23	N/A	N/A	N/A	N/A
1978	68	83	48	69	63	100	64
1988	67	77	54	58	88	44	100
Social Sciences							
1968	67	80	18	N/A	N/A	N/A	N/A
1978	51	56	36	45	71	58	85
1988	39	46	29	37	25	36	44

Note Figures for American Indians are not displayed because only one native American received a doctorate in 1978, and only nine Native Americans in total received doctorates in 1988

1 The Total, Men, and Women columns include foreign and domestic recipients, and also include those for whom race/ethnicity is unknown

2 Number is based on only one case

Source University of California-National Research Council Tapes Table 3-5

4 An Overview of Doctoral Education at the University of California

IN THE FOLLOWING sections, the Commission summarizes the doctoral education process as reproduced from *Factors Affecting Completion of Doctoral Degrees at the University of California* (attached as Appendix B)

The five stages of doctoral programs

The doctoral education process is long, arduous, and involves the mastery of numerous formal and informal requirements which are defined by faculty at the departmental level There is wide variation in the specific degree requirements between disciplines, and even within identical disciplines on different campuses The common thread connecting degree requirements in different programs is the presumption that the coursework and training offered prepares students as well rounded professionals in their respective fields, and the "original research" requirement demonstrates that the students are capable of contributing to the sum of knowledge in their area of study Despite the tremendous diversity in the specific requirements of doctoral programs in different disciplines, the doctoral process can be broken down into at least five identifiable stages (1) taking courses, (2) preparing for taking the qualifying examination, (3) finding a dissertation topic and writing a dissertation prospectus, (4) undertaking the research and writing of the dissertation, and (5) applying for a professional position

1. Taking courses

In the first stage of a doctoral program, students develop an advanced level of familiarity with their field During this stage, they specialize within the field and make connections with areas outside the field For the most part, they study in seminars or reading courses, under independent study, or in laboratory research projects led by faculty Doctoral students rarely take large lecture courses, unless they need an overview of a new area or a review of a minor subject area

Each doctoral program establishes its own set of requirements, in terms of the number of required courses and their content, as well as the form, sequence, and number of examinations For example, many engineering and physical science programs require a series of written or oral examinations at the end of the first year, known as the "prelims" The social sciences, humanities, and professional schools rarely require examinations at the end of the first year Another distinction among the programs, even in the same disciplines across the campuses of the University, is the flexibility of course requirements One example is between electrical engineering at Davis, which requires a fixed sequence of courses, and electrical engineering and computer science (EECS) at Berkeley, which has no specified course requirements at all In the Berkeley program, a group of electrical engineering faculty determines what particular courses are useful for each student In contrast, most social science programs not only require many courses within the field, including methodology courses, but also demand that courses be taken in other fields as well

Programs also differ considerably in their foreign language requirements Humanities fields usually require between two and three foreign languages, as is the case in most English programs, Asian history, art history, and music Social science fields, on the other hand, usually require one foreign language. Most life sciences, engineering, and physical science programs require no foreign language Mathematics is an exception, requiring at least one, if not two foreign languages

2. Preparing for and taking the qualifying examination

All programs have the qualifying examinations in common This series of examinations, however, varies widely in form, length, and the time at which it is taken Most programs include an oral component

For the humanities, social sciences, and professional schools, this examination usually consists of two parts (1) written examinations or three major papers, and (2) a one-and-one-half hour to three-hour oral examination, ranging in subject matter from all possible areas of the discipline to specific questions on the area of the dissertation Science and engineering students are often required to design one or two research proposals other than their dissertation for this examination The oral portion is usually a presentation of dissertation work that the student has already accomplished

After passing the qualifying examination, often no later than the semester following the exam, students are advanced to candidacy. After this point, they take no more required courses other than those directly related to their dissertation research.

3. Finding a dissertation topic and advisor, and writing a dissertation prospectus

This stage of the doctoral program has two parts (1) deciding on a topic and choosing the major faculty advisor -- this choice must be made before advancement to candidacy, but may already be determined during the first year -- and (2) writing a dissertation proposal or prospectus.

Deciding on a topic and advisor

For most students, the process of deciding on a topic and on an advisor go hand in hand Some students enter a doctoral program with a precise idea of both topic and faculty advisor Others develop their specific interests while taking courses, and those who are part of a laboratory research team may select a portion of the larger project to be their dissertation research. Still others select an advisor before choosing a topic These students base their decision on the anticipation of a good working relationship with the faculty member, regardless of whether their interest matches that of the faculty member Others, more pragmatically, choose a faculty member who has enough grant money to support students In addition, there are those students who are invited by certain faculty to study under them

Writing the dissertation proposal or prospectus

Many programs require a dissertation prospectus to be presented at the time of the qualifying examination or shortly thereafter A prospectus is usually an outline of the proposed dissertation research It includes a statement of the problem, a review of the literature, and a discussion of the methodology used Its length can vary from five to 40 pages

4. Undertaking the dissertation research and writing

Undertaking research

The nature of the actual research stage is predetermined by the discipline Each major field has its distinct way of conducting research. In the physical sciences, engineering, and molecular and cellular life sciences, it is practiced in a laboratory, most likely on campus Some physics or chemistry students may have to travel to major national laboratories for the use of specified facilities such as accelerators or light sources The work in these disciplines is often done in a team The exceptions in these fields are students in theoretical physics, mathematics, and statistics, who study alone, without laboratories or highly technical equipment

Students in the life sciences who study entire organisms often observe plants or animals in their natural habitats, which may be at distant locations Their research may also be limited to certain seasonal conditions and it is often an individualistic process

Many social science and professional discipline students may do research in the field, at home or abroad, normally spending a year on field research They usually work alone.

Humanities students typically do research in libraries and archives, reading and analyzing texts They

may take occasional trips to major libraries or archives, but today many texts are available on microfilm in the campus libraries. Their research mode is individualistic

Writing the dissertation

The second phase of the fourth stage -- the writing of the dissertation -- is a difficult period for students in all fields As the most critical requirement for the doctoral program, the dissertation demands consistent and continual attention The writing process itself is time-consuming and all-absorbing, moreover, successful organization and presentation of the student's original ideas depend especially on a significant amount of time thinking about and analyzing research material before a word can be written

During this critical stage, the availability of funds to cover both the research expenses and the cost of living while writing are essential, or many graduate students will be distracted by the demands of working to earn support money. Yet, in the humanities, social sciences, and professional fields, financial support for the dissertation writing stage is usually absent In addition, the isolated nature of research in these fields may also contribute to lengthened time to degree

5. Applying for professional employment

This fifth step is a common part of the doctoral process because the majority of students look for professional employment while in graduate school and begin the search for a permanent job during the final stage of the dissertation process In many fields, students make their first academic employment connections at annual national conferences The large professional associations, such as the Modern Language Association (MLA) or the American Educational Research Association (AERA), list job openings and conduct initial job interviews at the conference site Both faculty members and students agree that the absence or presence of a job offer has a major impact on the time to completion of the degree

This stage is comprised of several components. (1) the search for open positions, (2) the writing and presentation of a research talk, (3) the construction of a curriculum vitae and the forming of a dossier, and (4) preparation for an on-site job interview For academic positions, a campus interview for a faculty position is often a three-day event

An increasing feature of the faculty training process is that, for many life and physical science students, the next step is a post-doctoral research position The impact of the post-doctorate is discussed in more detail in the next section of this report In placement for all positions, particularly academic positions, the letter of recommendation from the dissertation advisor plays an essential role in the hiring process

Conclusion

As can be seen, these five stages of the doctoral process move graduate students through a series of roles and related levels of expertise and, like all learning experiences, occasion anxiety and difficult adjustments, as well as positive rewards from the research and writing involved in them.

5 *Attrition and Time to Degree*

Rates of attrition

Little is known about the attrition patterns of graduate students The University of California does not currently have the capacity for examining the attrition and completion rates of its doctoral students, although it is developing a Systemwide Graduate Longitudinal Database System that is expected to address this deficiency as soon as it has collected enough years of data For this report, the University was able to provide the Commission with results of two studies conducted over the past 20 years at UCLA (Benkin, 1984) and Berkeley The Commission refers to the UCLA study in Part Six, here it summarizes the Berkeley study, which involved a November 1988 survey of all of its doctoral students who had been admitted in 1975 through 1977 -- that is, 11 to 13 years earlier The survey found that about 80 percent of all doctoral students leave Berkeley with a graduate degree -- about 55 percent with a doctorate and 24 percent with a master's degree.

Doctoral recipients

As Display 12 below shows, 52 percent of Berkeley's doctoral students admitted between 1975 and 1977 had received the Ph.D by 1988, and the University expected about 3 percent more to eventually earn their doctorate. Foreign students had the highest completion rates (60 percent), followed by White students (52 percent), Asian students (50 percent), and Black, Latino, and Native American students (39 percent) Display 13 on page 24 shows that men had a significantly higher completion rate (55 percent) than women (45 percent)

Master's degree recipients

Students who do not complete their doctoral pro-

DISPLAY 12 *Completion of Graduate Degrees by Doctoral Students Admitted to the University of California, Berkeley, Between 1975 and 1977, by Ethnicity*

Ethnic Group	Doctoral Degree Awarded as of May 1988		Master's Degree Awarded as of May 1988		No Degree Awarded or Degree Pending as of November 1988*		Total Graduate Degrees Awarded as of November 1988		Total Cohort of Doctoral Students	
	%	N	%	N	%	N	%	N	%	N
All Minority	45%	183	26%	107	29%	116	71%	290	100%	406
Asian	50%	111	24%	53	26%	59	74%	164	100%	223
Chicano/Latino	39%	37	27%	25	34%	32	66%	62	100%	94
African American	40%	31	31%	24	29%	23	71%	55	100%	78
American Indian	36%	4	45%	5	18%	2	82%	9	100%	11
Non-Asian Minority	39%	72	30%	54	31%	57	69%	126	100%	183
White	52%	1,200	23%	538	24%	558	76%	1,738	100%	2,296
Foreign	60%	361	24%	144	17%	101	83%	505	100%	606
Other	40%	55	29%	40	32%	44	68%	95	100%	139
Total	52%	1,799	24%	829	24%	819	76%	2,628	100%	3,447

* Six percent (200 students) of the cohort were still pending as of November 1988 The University expects about half of them will eventually earn their doctorate

Source: Adapted from Table 20 of Appendix B below, which came from the Historical File, University of California, Berkeley

DISPLAY 13 *Completion of Graduate Degrees by Doctoral Students Admitted to the University of California, Berkeley, Between 1975 and 1977, by Sex, and General Ethnic Status*

Sex and Ethnic Status	Total Attrition Rate	Attrition Rate in Years 1 - 3*	Attrition Rate in Years 4 - 12*	Pending as of November 1988	Degree Awarded as of May 1988
Men					
All Minority	47%	35%	12%	6%	46%
White	40	29	11	5	55
Foreign	37	31	6	2	60
Others/Unknown	48	31	17	7	45
Total Men	40	30	10	5	55
Women					
All Minority	49	37	12	9	42
White	45	30	15	9	46
Foreign	43	35	8	4	53
Others/Unknown	72	42	30	9	18
Total Women	46	32	14	8	45
Total					
All Minority	48	36	12	7	45
White	41	29	12	6	52
Foreign	38	32	6	3	59
Others/Unknown	54	34	20	7	39
Total Students	42	31	11	6	52

* Could include students who left after obtaining only the master's degree

Source Graduate Division, University of California, Berkeley, November 1988 Survey

gram often obtain master's degrees instead Of the Berkeley doctoral students, 24 percent had earned a master's degree rather than a Ph D Non-Asian underrepresented students were about 7 percent more likely to obtain the master's degree than were students from other backgrounds This large proportion of master's recipients can be explained in two ways. (1) For a wide variety of reasons, some students change their degree aspirations, and (2) departments sometimes use the master's degree as a way to provide a degree to students who are thought to be otherwise unsuited for the doctorate Unfortunately, the available data do not address the question of why so many of Berkeley's doctoral students opted for master's degrees instead of the doctorate

Dropouts and pending degree recipients

The remaining doctoral students either had no degree or had a degree pending as of November 1988 Of the 819 students in this category, the University believes that about 25 percent were pending, and that about half of them will eventually receive a doctoral degree This would result in a total attrition rate of approximately 20 percent, a doctoral completion rate of 55 percent, with almost 25 percent master's degree recipients Non-Asian underrepresented students were somewhat more likely than White students to have not completed their degrees (31 percent, compared to 24 percent) Twenty-six percent of Asian students had not completed their degrees, and foreign students had the lowest non-completion rate at 17 percent Women had higher attrition rates than men in the arts, biological science, engineering, natural resources, physical science, and social science Men had higher attrition in language and literature, as well as in the professional fields

Differential attrition among fields of study

Overall, languages and literature had the highest attrition (60 percent), followed by arts (51 percent), professional fields (49 percent), and engineering (44 percent) The physical and biological sciences had the lowest attrition rates, at approximately 31 percent These findings closely parallel the discipline distribution of time to degree, with those disciplines with high attrition also tending to have high time to degree Data are not available for examining differences in attrition by ethnicity among the major academic disciplines

Summary

In sum, 76 percent of all students entering doctoral study at Berkeley between 1975 and 1977 received some degree by 1988, with 52 percent of them obtaining the doctorate However, only 45 percent of the women and only 39 percent of non-Asian underrepresented students received the doctorate during this period

Increases in time to degree

At the University of California, elapsed time to the doctorate has increased by approximately one year for the period from 1968 to 1988, including time spent at other graduate institutions (Display 14) Time from receipt of the bachelor's degree until entrance into graduate school has not increased significantly since 1968, whereas the time students spend withdrawn from doctoral programs has decreased substantially -- from 2 1 years to 1 5 This indicates that the increase in time is largely attributable to the additional time students spend "registered" in doctoral programs The data support this conclusion, indicating that "registered time to degree" at the University has increased by 1 5 years since 1968, moving from 5 9 years to 7 4 years (Display 15)

Time increases by field of study

At least since 1968, wide variations in time to degree have existed amoing academic disciplines at the University of California These differences have

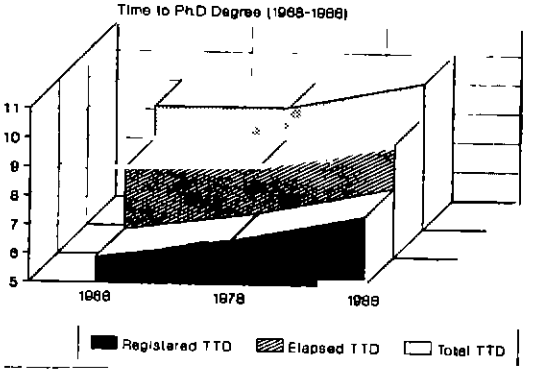
*DISPLAY 14 Mean Number of Years to the Doctoral Degree for All Degree Recipients, at All Nine Campuses of the University of California, 1968, 1978, and 1988**

Type of Time Measure	1968	1978	1988	Change 1968-1988
Total Time to Degree	9 1	9 1	10 0	0 9
Pre-Graduate Study	1.1	1 0	1 2	0 1
Elapsed Time to Degree	8 0	8 1	8 9	0 9
Master's Degree Time	1 6	1 6	1 7	0 1
Master's-Ph D Time	6.4	6 5	7 2	0 8
Registered Time to Degree	5 9	6 5	7 4	1 5
Withdrawn	2 1	1 6	1 5	-0 6

* Includes graduate study time at institutions other than the University of California

Source: University of California-National Research Council Tapes, Table 7

DISPLAY 15 Comparison of Changes in Registered, Elapsed, and Total Time to the Doctorate, University of California, 1968 to 1988



Source: National Research Council, Survey of Earned Doctorates.

persisted to the present (Display 16, page 26) In 1988, disciplines in professional fields had the longest mean elapsed time to degree, at 10 4 years, followed by the arts and humanities (10 3 years), social sciences (8 8), life sciences (7 1), physical sciences (6 6), and engineering and computer science (6 3) This order has not changed much since 1968, although there have been some shifts among the science disciplines

DISPLAY 16 *Mean Time to Doctoral Degree at All Campuses of the University of California by Field of Study, 1968, 1978, and 1988**

	1968	1978	1988	Change, 1968-1988
All Disciplines				
Total Time to Degree	**7.8**	**8.2**	**8.8**	**1.0**
Pre-Graduate Study	1 2	0 9	1 1	-0 1
Elapsed Time to Degree	**6.7**	**7.2**	**7.7**	**1 0**
Registered Time to Degree	**5.4**	**6.1**	**6.8**	**1.4**
Withdrawn	1 2	1 1	0 9	-0 3
Arts and Humanities				
Total Time to Degree	**10.2**	**10 3**	**11.8**	**1 6**
Pre-Graduate Study	2 0	1 1	1 5	-0 5
Elapsed Time to Degree	**8.2**	**9.2**	**10.3**	**2 1**
Registered Time to Degree	**6.2**	**7.4**	**8.7**	**2 5**
Withdrawn	2 0	1 8	1 7	-0 3
Engineering and Computer Sciences				
Total Time to Degree	**7.7**	**8.1**	**7.5**	**-0.2**
Pre-Graduate Study	1 4	1 3	1 2	-0 2
Elapsed Time to Degree	**6.4**	**6 8**	**6.3**	**-0.1**
Registered Time to Degree	**5 3**	**5.8**	**5.8**	**0 5**
Withdrawn	1 1	1 0	0 6	-0 5
Life Sciences				
Total Time to Degree	**7.1**	**7 2**	**8 1**	**1.0**
Pre-Graduate Study	1 1	0 9	1 1	0
Elapsed Time to Degree	**6.0**	**6.4**	**7.1**	**1.1**
Registered Time to Degree	**5.2**	**5.7**	**6 3**	**1.1**
Withdrawn	0 8	0 7	0 8	0
Physical Sciences				
Total Time to Degree	**6.0**	**6.8**	**7.3**	**1.3**
Pre-Graduate Study	0 6	0 4	0 7	0 1
Elapsed Time to Degree	**5.4**	**6.3**	**6.6**	**1.2**
Registered Time to Degree	**5.0**	**5.7**	**6 3**	**1 3**
Withdrawn	0 4	0 6	0 3	-0 1
Professional Fields				
Total Time to Degree	**13.0**	**11.2**	**12.9**	**-0.1**
Pre-Graduate Study	1 7	2 0	2 5	0 8
Elapsed Time to Degree	**11.3**	**9.2**	**10.4**	**-0.9**
Registered Time to Degree	**6.5**	**6.8**	**8.0**	**1.5**
Withdrawn	4.9	2 4	2 4	-2 5
Social Sciences				
Total Time to Degree	**8.3**	**8.9**	**10.0**	**1.7**
Pre-Graduate Study	1.2	1 1	1 2	0
Elapsed Time to Degree	**7.1**	**7.8**	**8.8**	**1.7**
Registered Time to Degree	**5.5**	**6.5**	**7 4**	**1.9**
Withdrawn	1 6	1 3	1 4	-0 2

* Time to degree was calculated for only those doctorate recipients who received a master's degree at the same campus at which they earned their doctorate and for those who received no master's degree

Source: University of California-National Research Council Tapes, Table 11

Overall, the arts and humanities at the University of California have experienced the largest increase in time to degree since 1968 (2 1 years), followed by social sciences (1 7). Time to degree in the life and physical sciences has increased by 1 1 and 1 2 years, with actual declines observed in the professional fields (-0 9 years) and engineering and computer science (-0 1) (Appendix B)

Students in most fields at the University of California experienced a slight decline in the time they spend withdrawn from programs, with those in the professional fields showing the largest decline (2 4 years) The big factor driving longer time to degree appears to have been the time students spend registered in graduate programs, which increased substantially in all disciplines These findings, both for overall time to degree and for shifts within disciplines, are generally consistent with trends which have been observed nationwide For national comparison purposes, it is necessary to include the time University of California students may have spent in programs outside the University of California system

Time increases by gender

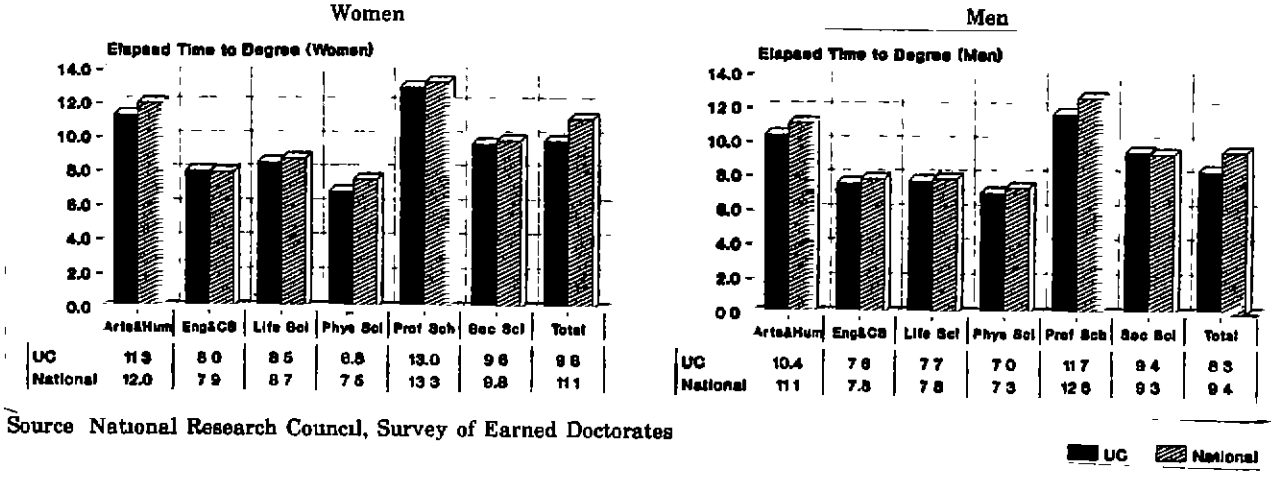
Overall, time to degree for University of California women is approximately 1 5 years longer than for men, however much of the explanation for this phenomena can be found in the clustering of women in disciplines with longer times to degree Within individual disciplines, men continue to have shorter time to degree, but the range narrows from the overall average of 1 5 years, to 1 1 years in the arts and humanities, 1 3 years in professional fields, 0 7 years in the life sciences, 0 4 years in engineering and computer science, and 0 2 years in the social sciences Women actually had shorter time to degree than men in the physical sciences These patterns are very similar to those that can be seen on the national level (Display 17 below)

Even though most of the overall difference in time to degree between men and women at the University can be explained by discipline clustering, it is interesting that the biggest gender-based time differences persist in those disciplines where women are most heavily enrolled (professional fields and arts and humanities) This may indicate that the major causes of long time to degree are related most strongly to factors affecting individual disciplines, but causes within individual disciplines may also have differential effects by gender

Time increases by ethnicity

Since the number of students from underrepresented backgrounds receiving doctorates has been so small historically, the University of California combined all underrepresented students receiving doctorates from 1980 to 1988 and calculated the mean time to degree for this aggregated group in order to allow for meaningful statistical analysis Because the discipline clustering and time to degree for Asian students is substantially different than for

DISPLAY 17 *Mean Elapsed Time to Doctoral Degree, by Discipline and Gender, University of California and Nationally, 1980 Through 1988*

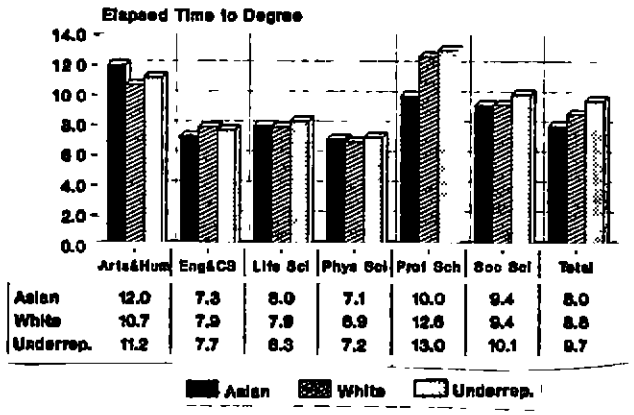


Source National Research Council, Survey of Earned Doctorates

other underrepresented students, these students have been separated for individual analysis

As Display 18 below shows, for the period from 1980 to 1988, Asian students at the University of California had the lowest elapsed time to degree (8.0 years), followed by White students (8 8), and Non-Asian students from underrepresented ethnic backgrounds (9 7) These findings were similar to those regarding gender differences

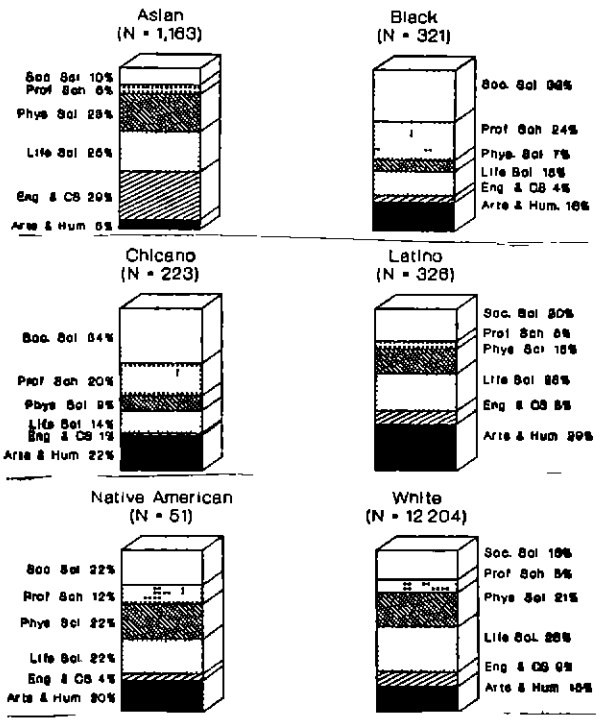
DISPLAY 18 Mean Elapsed Time to Doctoral Degree at the University of California, by Discipline and Ethnicity, 1980 Through 1988



	Arts&Hum	Eng&CS	Life Sci	Phys Sci	Prof Sch	Soc Sci	Total
Asian	12.0	7.3	8.0	7.1	10.0	9.4	8.0
White	10.7	7.9	7.9	6.9	12.6	9.4	8.8
Underrep.	11.2	7.7	8.3	7.2	13.0	10.1	9.7

Source National Research Council, Survey of Earned Doctorates

DISPLAY 19 Distribution of Doctoral Recipients at the University of California by Discipline and Ethnicity, 1980 Through 1988



Note: The National Research Council separated Chicanos and Latinos into separate groups in this analysis

Source National Research Council, Survey of Earned Doctorates

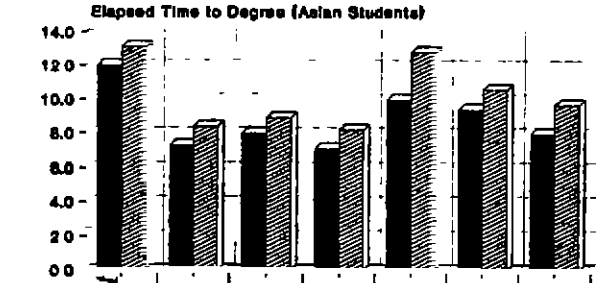
Part of the difference in time to degree between ethnicities at the University can be explained by the clustering of Asian students in programs with the shortest time to degree, and the clustering of Non-Asian underrepresented students in disciplines with the highest time to degree (Display 19) However, while the time to degree differences between ethnicities within individual disciplines were always smaller than the overall difference (owing to the clustering of students), the biggest differences between ethnicities within individual discipline categories were still in those disciplines that already have the highest time to degree For example, while overall time to degree was 0 9 years longer for Black, Latino, and Native American students compared to White students, the gap narrowed in social sciences (0 7), arts and humanities (0 5), professional fields and life sciences (0 4), and physical sciences (0 3). Although the number of students involved was small, Non-Asian underrepresented students actually had a lower time to degree than White students in engineering and computer science (7 7 compared to 7 9 years) (Appendix B)

As can be seen in Display 20 on the opposite page, these University of California findings closely reflect national trends, both in terms of overall time to degree and variations by ethnicity within disciplines They are also consistent with the previously discussed variations in time to degree by gender It appears that "discipline area" is most predictive of student time to degree and that a good portion of the current gender and ethnic differentials in time to degree are explainable by the clustering of students in those disciplines with the longest time to degree Nevertheless, not all gender and ethnic differences can be explained in this way

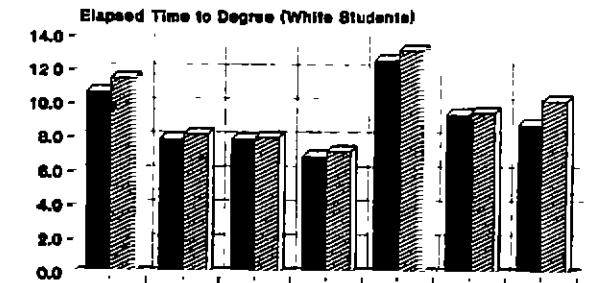
Even though the differences in gender- and ethnic-specific time to degree are lower in individual disciplines than overall (due to the clustering phenom-

DISPLAY 20 Mean Elapsed Time to Doctoral Degree, by Discipline and Ethnicity, University of California and Nationally, 1980 Through 1988

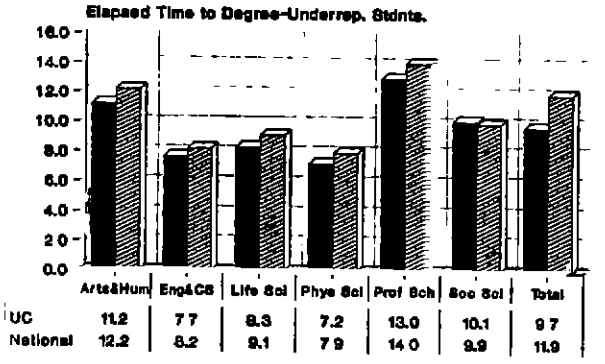
Asian Students



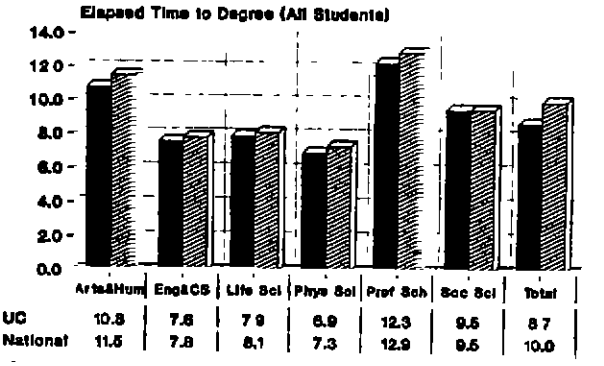
White Students



Black, Latino, and Native American Students



All Students



Source National Research Council, Survey of Earned Doctorates

UC National

ena), the largest and most persistent gender and ethnic gaps are found in disciplines that have the longest overall time to degree This could be interpreted as follows. Long time to degree may correlate more strongly to discipline category than to student gender or ethnicity, but whatever factors contribute to long time to degree in these disciplines have a disproportionately strong effect on women and students from historically underrepresented backgrounds

6 *Factors Contributing to Attrition and Long Time to Degree*

Overview of factors contributing to long time to degree

Going back to at least 1960, scholars and policymakers have been examining time to degree as it affects the modern university A review of the national literature on the subject, as well as the data presented thus far, indicates that there is no single factor that can be identified as "the reason" for extended time to degree Rather, there are many factors at work on the institutional/departmental level, as well as on the individual level which contribute, in differing extents, to longer time to degree

This conclusion has been confirmed by the most recent and comprehensive national study of the subject to date -- Howard Tuckman's *On Time to the Doctorate. A Study of Increased Time to Complete Doctorates in Science and Engineering* (1990) Tuckman found that students in science and engineering "now take longer to complete their doctorates than at any previous time in this century" and his analysis of the factors underlying this fact "revealed a complex process that is affected by a variety of factors including availability of student support, labor-market conditions, socio-demographic characteristics of the degree recipients, and characteristics of both undergraduate and graduate degree-granting institutions As noted earlier, no one of these factors consistently explained the pervasive upward trend that was found" (p 4)

1. Level of structure and supervision

Longer time to degree and higher attrition rates correlate with those disciplines that offer the least structure and supervision. Research training in the sciences tends to be laboratory- and group-oriented, highly structured, closely supervised, and has shorter time to degree Conversely, research training in the arts, humanities, social sciences, and the professions tends to be individualistic and less structured, with less supervision of day-to-day progress in research activities. While causality is difficult to establish, the data indicate that time to degree is longer in those individualistic disciplines with lower levels of structure· Time to degree in the arts and humanities is 10 3 years, 10 4 years in the professions, and 8 8 years in the social sciences, compared to 6.3 years in engineering and computer science, 6.6 years in the physical sciences, and 7 1 years in the life sciences As shown in Displays 21 and 22 on pages 32 and 33, these differences generally persist without regard to gender or ethnicity (Appendix B)

2. Graduate student financial support

Since 1980, the total expenses facing graduate students at the University of California have increased approximately 21 percent, moving from $12,007 in 1980 to $15,105 in 1988 During this time, available financial support has been covering a smaller proportion of students' total expenses, going from 73 percent of total expenses in 1980 to 64 percent in 1988. The effect of these trends on student time to degree is predictable Overall, students whose major financial support came from their own earnings took the longest time to complete their degrees (11 years), followed by those who secured loans (9 4), teaching assistantships (8 3), fellowships (7 9), and research assistantships (7 0) Most importantly, these patterns generally persist even within individual degree categories and by gender/ethnicity

For example, in the social sciences, students supporting themselves primarily with their own resources have the longest time to degree (10 8 years), followed by students on loans (9 2), students on fellowship (8 7), teaching assistantships (8 4), and research assistantships (8 1) (Display 23, page 34) As can be seen, this is not true in all cases, but the general pattern indicates that the source of student fi-

DISPLAY 21 *Relationship of Nature of Research and Discipline to Mean Time to Degree at the University of California by Ethnicity, 1978 and 1988*

Ethnicity, Nature of Research, and Discipline	1978		1988		Years' Difference, 1978-1988
Asian					
Primarily Individualistic Research					
Arts and Humanities	7 7	(3)	10 0	(9)	2 3
Professional Schools	12.0	(1)	10 0	(3)	----
Social Sciences	10 6	(5)	8 0	(7)	-2 6
Research Primarily in Laboratory Settings					
Engineering	6 9	(17)	6 5	(22)	-0 4
Life Sciences	6 6	(19)	7 2	(22)	0 6
Physical Sciences	5 7	(15)	6 8	(19)	1 1
All Fields	6 9	(60)	7 4	(82)	0 5
Black, Latino, and Native American					
Primarily Individualistic Research					
Arts and Humanities	9 5	(13)	9 5	(13)	0 8
Professional Schools	8.5	(4)	10 3	(6)	1 8
Social Sciences	7 2	(19)	8 2	(18)	1 0
Research Primarily in Laboratory Settings					
Engineering	6 5	(4)	7 7	(4)	1 2
Life Sciences	5 7	(9)	7 5	(14)	1 8
Physical Sciences	6 3	(4)	7 1	(13)	0 8
All Fields	7.5	(53)	8 4	(68)	0 9
White					
Primarily Individualistic Research					
Arts and Humanities	9 2	(163)	10 4	(140)	1 2
Professional Schools	9 9	(32)	11 4	(38)	1 5
Social Sciences	8 0	(182)	9 2	(153)	1 2
Research Primarily in Laboratory Settings					
Engineering	7 8	(65)	6 9	(124)	-0 9
Life Sciences	6 4	(268)	7 2	(287)	0 8
Physical Sciences	6 4	(236)	6.7	(239)	0 3
All Fields	7 4	(946)	8 0	(981)	0 6

* Time to degree was calculated for only those doctorate recipients who received a master's degree at the same campus at which they earned their doctorate and for those who received no master's degree.

Note: Numbers in parentheses indicate the number of students for which data exist.

Source: Adapted from University of California-National Research Council Tapes, Table 12

nancial support has a strong effect on time to degree overall, even within individual discipline categories. These findings have been generally confirmed by Benkin (1984), Grigg (1965), and Wilson (1965) The source of financial support has a disproportionate effect on women and underrepresented students from non-Asian backgrounds, since these students tend to be clustered in disciplines that rely on fund-

DISPLAY 22 *Relationship of Nature of Research and Discipline to Mean Time to Degree at All Nine Campuses of the University of California, by Gender, 1968, 1978, and 1988*

Gender, Nature of Research, and Discipline	1968	1978	1988	Years' Difference, 1968-1988
Men				
Primarily Individualistic Research				
Arts and Humanities	8 3 (62)	9 4 (108)	10 2 (87)	1 9
Professional School	10 7 (46)	8 5 (35)	10 1 (35)	-0 6
Social Sciences	6 9 (88)	7 6 (170)	8 9 (112)	2 0
Research Primarily in Laboratory Settings				
Engineering and Computer Science	6 3 (81)	6 7 (125)	6 3 (203)	0 0
Life Sciences	5 9 (162)	6 3 (252)	6 9 (225)	1 0
Physical Sciences	5 4 (233)	6 3 (275)	6 7 (281)	1.3
All Fields	6 5 (672)	7 0 (965)	7 4 (943)	0 9
Women				
Primarily Individualistic Research				
Arts and Humanities	7 9 (17)	8 9 (84)	10 5 (92)	2 6
Professional School	13 3 (13)	10 4 (18)	11 0 (23)	-2 3
Social Sciences	7 6 (31)	8 4 (68)	8 6 (93)	1 0
Research Primarily in Laboratory Settings				
Engineering and Computer Science	9 0 (1)	8 5 (4)	6 7 (18)	----
Life Sciences	6 8 (33)	6 6 (88)	7 5 (130)	0.7
Physical Sciences	5 4 (11)	6 8 (27)	6 4 (63)	1 0
All Fields	7 9 (106)	8 0 (289)	8 4 (419)	0 5
Total				
Primarily Individualistic Research				
Arts and Humanities	8 2 (79)	9 2 (192)	10 3 (179)	2 1
Professional School	11 3 (59)	9 2 (53)	10 4 (58)	-0 9
Social Sciences	7.1 (119)	7 8 (238)	8 8 (205)	1 7
Research Primarily in Laboratory Settings				
Engineering and Computer Science	6 4 (82)	6 8 (129)	6 3 (221)	-0 1
Life Sciences	6 0 (195)	6.4 (340)	7 1 (355)	1 1
Physical Sciences	5 4 (244)	6 3 (302)	6 6 (344)	1 2
All Fields	6 7 (778)	7 2(1,254)	7 7(1,362)	1 0

* Time to degree was calculated for only those doctorate recipients who received a master's degree at the same campus at which they earned their doctorate and for those who received no master's degree

Note Numbers in parentheses indicate the number of students for which data exist

Source. Adapted from University of California-National Research Council Tapes, Table 10

ing sources (such as loans and students' own funds) that are related to longer time to degree (Display 24, page 35).

3. Master's degree requirements

Receipt of a master's degree is a prerequisite for admission into doctoral programs in several disciplines in the humanities and professional fields

DISPLAY 23 *Mean Time from Graduate Entry to Ph D Degree Awarded at the University of California, by Field of Study, Primary Type of Financial Support, Sex, and Ethnicity 1980 Through 1988*

	Total*	Men*	Women*	Asians	Whites	Total Non-Asian Minorities	African Americans	Chicanos/ Latinos
All Disciplines								
Fellowship	7 9	7 7	8 2	7 8	7 7	9 1	10 5	8 0
Loans	9 4	9 2	9 8	11.8	9 4	10 1	8 9	11 8
Other/Own	11 0	10.3	12 1	10 4	11 4	13 0	15 5	11 5
Own	*12 0*	*11 6*	*12 7*	*10.6*	*12 1*	*13 8*	*16 4*	*11 9*
Spouse	*10.5*	*9 1*	*11 8*	*11 4*	*10 4*	*11 3*	*12 8*	*10 3*
Family	*8 7*	*8.2*	*9 7*	*8.8*	*9 4*	*9 0*	----	*11 0*
Other	*8 6*	*8.5*	*9 6*	*6.5*	*10 4*	*9 7*	*9 0*	*10 0*
Research Assistant	7 0	6 9	7 3	7 3	7 0	6 9	8 3	6 7
Teaching Assistant	8 3	8 0	8 9	8 0	8 5	8 9	8 9	8 8
Arts and Humanities								
Fellowship	9 9	9 8	10 0	12 1	9 9	9 7	9 9	9 9
Loans	10 9	10 4	11 4	13.5	10 4	14 7	12 0	20 0
Other/Own	12 1	11 6	12 5	16.4	12 0	12 5	12 1	12 2
Research Assistant	9 7	9 3	10 1	9 8	9 8	9 0	---	9 0
Teaching Assistant	9 8	9 5	10 2	10 5	9 9	10 2	9 9	10 4
Engineering and Computer Sciences								
Fellowship	7 9	7 9	7 6	8 4	7 8	7 7	6 0	8 3
Loans	8 7	8 7	9 0	6 0	9 4	----	----	----
Other/Own	9 3	9 2	10 1	8 9	10 7	11 1	10 7	11 4
Research Assistant	6 7	6 6	7 0	6 9	6 8	6 5	8 5	5.7
Teaching Assistant	7 2	7 2	5 7	8 2	7 4	5 0	----	3 0
Life Sciences								
Fellowship	7 4	7 2	7 6	7 3	7 2	8 2	10 9	6 9
Loans	7 4	7 7	6 8	6 0	7 6	6 0	6 0	----
Other/Own	9 9	9 1	11 2	9 3	10 2	12.5	17 5	9 6
Research Assistant	7 3	7 2	7 3	8.0	7 2	6 8	7 4	6 9
Teaching Assistant	7 6	7 4	8 0	7 3	7 6	7 9	8 8	7 1
Physical Sciences								
Fellowship	6 5	6 4	6 6	6 8	6 4	7 2	9 0	6 5
Loans	7 8	8 3	6 0	----	7 8	----	----	----
Other/Own	9 0	9 0	9 2	10 1	9 3	8.0	7 0	8 0
Research Assistant	6 5	6 6	6 2	7 0	6 4	6.8	8.0	6 4
Teaching Assistant	6 8	6 8	6 7	6 8	6 8	6.9	7 3	6 4
Professional Schools								
Fellowship	10 3	10 1	10 5	9.8	10 8	10 4	10 6	10 0
Loans	10 3	9 7	11 2	----	10 6	7 0	4 0	10 0
Other/Own	13 3	12 8	13 9	11 1	13 7	15 3	17 2	13 3
Research Assistant	9 7	9 5	10 0	10 4	9 9	6 0	----	6 0
Teaching Assistant	9 3	9 3	9 2	8 8	9 7	9 0	9 0	----
Social Sciences								
Fellowship	8 7	8 6	9 0	8 0	8 5	9 6	10 9	8 2
Loans	9 2	9 3	9 2	16 0	9 0	9 5	9 3	9 7
Other/Own	10 8	10 6	10 9	10 7	10 8	11 9	14 8	9 6
Research Assistant	8 1	8 0	8 2	8 0	8 0	9 5	10 7	8 3
Teaching Assistant	8 4	8 5	8 2	7 9	8 4	8 7	9 4	7 7

* Total, Men, and Women columns include foreign and domestic recipients, and also include those for whom ethnicity/race is unknown

Note. Native Americans are included in the Total Non-Asian Minorities and in the Total, Men, and Women columns

Source University of California-National Research Council Tapes, Table 14

DISPLAY 24 Primary Type of Financial Support of Doctoral Recipients at the University of California by Field of Study, Sex, and Ethnicity in Percents, 1980 Through 1988

	Total*	Men*	Women*	Asians	Whites	Total Non-Asian Minorities	African Americans	Chicanos/ Latinos
All Disciplines								
Fellowship	22%	21%	22%	23%	21%	33%	38%	32%
Loans	1	1	1	1	1	2	3	1
Other/Own	30	27	38	20	31	36	38	34
Own	*17*	*16*	*21*	*12*	*19*	*27*	*31*	*25*
Spouse	*8*	*5*	*13*	*5*	*9*	*7*	*6*	*7*
Family	*2*	*2*	*2*	*3*	*2*	*1*	*<1*	*<1*
Other	*3*	*4*	*2*	*0*	*1*	*1*	*1*	*2*
Research Assistant	28	32	17	41	26	13	7	15
Teaching Assistant	19	18	21	15	20	16	13	18
Arts and Humanities								
Fellowship	12	15	10	16	10	23	41	18
Loans	2	1	2	4	2	2	5	1
Other/Own	38	36	42	31	39	40	31	43
Research Assistant	2	2	2	11	2	1	0	1
Teaching Assistant	45	46	44	38	47	34	23	38
Engineering and Computer Sciences								
Fellowship	18	18	24	12	22	28	30	30
Loans	1	1	1	0	1	0	0	0
Other/Own	26	26	29	23	28	36	30	39
Research Assistant	49	50	43	59	45	31	40	26
Teaching Assistant	6	6	2	7	5	5	0	4
Life Sciences								
Fellowship	37	36	38	45	37	43	46	44
Loans	1	1	1	0	1	1	3	0
Other/Own	22	21	25	15	20	17	21	13
Research Assistant	29	31	25	29	29	30	21	35
Teaching Assistant	11	11	11	11	12	9	10	8
Physical Sciences								
Fellowship	15	15	17	15	15	24	19	27
Loans	0	0	0	0	0	0	0	0
Other/Own	14	15	12	7	14	12	6	10
Research Assistant	49	49	50	60	52	38	19	39
Teaching Assistant	21	22	20	18	20	27	56	24
Professional Schools								
Fellowship	13	15	11	19	8	23	26	23
Loans	2	2	2	0	3	2	2	2
Other/Own	72	66	77	55	75	73	70	74
Research Assistant	8	9	7	14	8	1	0	2
Teaching Assistant	6	7	4	13	5	1	2	0
Social Sciences								
Fellowship	21	21	21	23	18	44	46	45
Loans	2	3	2	2	3	3	4	3
Other/Own	40	38	42	31	41	38	35	35
Research Assistant	11	12	10	14	12	3	4	3
Teaching Assistant	25	26	25	30	26	13	12	15

* Total, Men, and Women include all foreign and domestic, and also include those for whom ethnicity/race is unknown

Note Native Americans are included in the Total Non-Asian Minorities and the Total, Men, and Women columns.

Source: University of California-National Research Council Tapes, Table 13

This requirement adds an average of 1 6 years to the doctoral degree in the professional fields If the master's degree is earned at an institution other than the one granting the doctorate, time to degree rises by 2 2 years In humanities programs that require the master's degree, time to degree increases by 1 5 years overall and four years for students who acquire the master's degree elsewhere This factor has a particularly strong effect on women and underrepresented students from non-Asian backgrounds, since they tend to be clustered in fields requiring the master's degree (Appendix B)

Because the master's degree variable severely skews analysis of all other factors influencing time to degree, the effect of the master's degree on doctoral time to degree has been controlled for in this study This was accomplished with most data by excluding the time to degree for students who obtained the master's degree at an institution other than the doctoral granting institution. Nevertheless, it should not be forgotten that the master's degree adds substantially to the time to doctoral degrees. This effect can be fully seen in Display 25 below and Display 26 on page 37

4. Doctoral degree requirements

With a few exceptions, it does not appear that the "formal" requirements for completion of the doctoral degree have increased in recent years In fact, several programs have reduced requirements, made them more flexible, or implemented mechanisms to help keep students on track toward timely completion of degree requirements It is not known whether or not the "informal" requirements, which do not appear in print, may have increased over time It is a fact, however, that postdoctoral experience has become a near prerequisite to faculty employment in many science disciplines, such as chemistry While this does not increase time to degree per se, it is an informal pre-employment delay that has increased the time it takes to prepare many doctoral students for faculty employment

Regardless of the lack of change in degree requirements over time, it is important to note that there were active discussions, *prior to the recent increase in time to degree,* that suggested that degree requirements in some disciplines may be more stringent than necessary One of the first to address this

DISPLAY 25 Mean Time to Degree of Doctorate Recipients at the University of California by Master's Degree Status and Major Field of Study, 1980 Through 1988

	No Master's Degree			Master's Degree Earned at Other Campus or Institution			Master's Degree Earned at Same Campus		
	Total Time to Degree	Elapsed Time to Degree	Registered Time to Degree	Total Time to Degree	Elapsed Time to Degree	Registered Time to Degree	Total Time to Degree	Elapsed Time to Degree	Registered Time to Degree
Arts and Humanities	10.6	9 0	8 1	14 6	13.0	9 6	11 6	10 5	8 7
Engineering and Computer Sciences	7 6	6 4	6 1	10 6	9.7	7 4	8 3	7 1	6 4
Life Sciences	7 9	7 0	6 6	11 6	10.5	8 2	10 2	8 7	7 2
Physical Sciences	7 1	6 5	6 2	10 4	9 7	8 1	8 2	7 5	6 9
Professional Schools	12 1	9 9	7 8	15 5	13.7	8 9	13 7	11 5	8 6
Social Sciences	9 6	8 4	7 5	13 1	11 9	9 0	10 2	9 2	7 8
All Disciplines	8 0	7 5	6 6	12 6	11 4	8 5	10 0	8 9	7 5

Source· University of California-National Research Council Tapes, Table 8.

DISPLAY 26 *Proportion of Doctoral Recipients by Master's Degree Status and Major Field of Study at the University of California, 1968, 1978, and 1988*

	No Master's Degree			Master's Degree Earned at Other Campus or Institution			Master's Degree Earned at Same Campus		
Major Field of Study	1968	1978	1988	1968	1978	1988	1968	1978	1988
Arts and Humanities	10%	14%	11%	40%	32%	39%	50%	54%	50%
Engineering and Computer Sciences	10	12	14	44	41	40	47	47	46
Life Sciences	44	48	50	38	29	31	18	24	19
Physical Sciences	46	46	50	24	19	21	30	35	29
Professional Schools	6	7	9	64	65	62	31	27	29
Social Sciences	29	23	20	35	27	36	36	50	44
All Disciplines	30	30	30	38	31	35	32	38	35

Note Percents are taken from the counts of elapsed time to degree (time from entry in any graduate program to Ph D)

Source University of California-National Research Council Tapes, Table 9

issue was Berelson (1960), who suggested that the dissertation itself may be a cause for attrition and long time to degree Berelson indicated that after finances, dissertation length was the second most important barrier to timely degree completion He suggested that academia consider viewing the dissertation more as a training tool and less as an original contribution to the sum of human knowledge Benkin (1984) also noted that there were close ties between dissertation length in a discipline and time to degree in that discipline

5. Teaching requirements

Another factor that relates to long time to degree is overreliance on teaching assistantships as a source of student financial support Berelson (1960) cited professors who exploit students as teaching and research assistants as a cause for longer time to degree While there is little data available to support that charge 30 years later, anecdotal accounts indicate that excessive reliance on teaching assistants continues to be a problem

Two years' teaching assistant experience, along with training workshops and effective supervision, is generally taken to provide a solid basis for assuming future faculty teaching responsibilities However, much more than this can become detrimental One University of California study indicated that students who taught more than three years take one year longer to complete their degrees than students who taught less than three years Students at the University of California whose primary source of financial support is teaching assistantships take 1 3 years longer than students whose primary support comes from research assistantships It may not be coincidental that teaching assistantships are more heavily relied upon for student support in those disciplines with the longest time to degree Wilson (1965), Grigg (1966), University of California (1990), and the data in this report all indicate that overreliance on teaching assistantships contributes to longer time to degree, while research assistantships generally do not.

What is more, particularly in those departments that do not have research asistantships, reliance on loans and personal resources usually correlates with even longer time to degree than reliance on teach-

ing assistantships Thus it is important that financial aid alternatives be found for students in disciplines within the humanities and social sciences where only teaching assistanships are available

6. Departmental support, faculty advising and guidance: the campus climate

The level and quality of departmental interaction, faculty advising, and moral support is a major factor contributing, not only to timely completion of degrees, but also to whether or not students complete their degrees at all Students rely to a very large degree on the departmental community to provide support generally, and faculty to provide them with the mentorship and guidance necessary to navigate the many formal and informal requirements associated with obtaining the doctoral degree

Peer relations

Available research in this area is limited, however, B L Duncan's 1976 study at the Berkeley campus of the University of California in the early to mid-1970s provides an indication of the importance of this issue, especially for historically underrepresented students (Appendix C of this document reproduces Duncan's report in its entirety) Other research conducted since that time have confirmed the basic accuracy of Duncan's conclusions as well as the fact that this problem is not limited to the University of California but is in reality a national phenomena (Burrell, 1981, Mingle, 1978, Rutledge, 1983, Sandler, 1985, Trujillo, 1986, and CPEC, 1990) Duncan wrote (p 230)

> What of the incoming graduate minority student? If he is cut off from informal channels of communication with fellow students, the adjustment must be very difficult Evidence of the high attrition among minorities during the first year may be in part attributed to the inability of the white departmental community, particularly peers, to form the support network that provided for integration. These are the "rules of the game" that are integral to ensuring survival. They are not learned from catalogues, professors, or administrators but from peers White students who have often learned the game so well are at an advantage and appear unwilling, for whatever reasons, to share this skill . Graduate minority students are an isolated group Data from the Wright Institute and UCB Minority Surveys provide strong evidence for this assertion Nearly 65 percent of the minority students report "rarely or never" socializing with other graduate students in their department compared to a relatively small (15 percent) percentage of whites

Faculty relationships

Duncan went on in his study to describe student perceptions of their relationships with the faculty (page 233)

> In the eye of the graduate minority students, their professors are unfair, indifferent, unaccepting, manipulative, aloof, paternalistic, elitist, pompous, sanctimonious, racist, and insolent (White and minority students agree to the extent that "both" think that professors are indifferent and aloof) When asked "What kind of relationship do you have with your professors and what do you think of them as people?" four out of five minority student were uncomplimentary in response Chicanos, Blacks, and Native Americans particularly resented being viewed as less than adequate students and in need of remediation The Asian-Americans commented on being treated distantly and coldly and as outsiders who had to be tolerated The minority graduate students in general felt it unfair to be put in the position of having to prove themselves before they are accepted, unlike the white student who, they think, are accepted without first having to prove themselves

The extent to which students reported that they developed close mentoring relationships with faculty is especially important (page 233)

> The students were asked "Has any professor really taken you in hand and helped you become a professional in your field?" While one out of four white students answered "yes," just one out of twenty minority students did so

It is a serious enough concern that only 25 percent of White students reported a close mentoring relationship, but the fact that only 5 percent of under-

represented students reported such relationships is truly disturbing

Attrition

Duncan's study also provides important insights into the reasons that students report influence their decisions to leave school (page 237)

> The severity of adjustment for the minority students is seen in how often they have felt that they "did not want to continue in their field" and "how often in the school year they considered quitting graduate school and for what reasons." Thirty-eight percent of the minority students considered quitting "daily" or a "couple of times a week" compared to 13 percent of the whites. There were similar responses to the question about thoughts of not continuing in their field Lack of encouragement from professors and financial pressures predominated among minority students' reasons for considering quitting The distribution of reasons were different for white students General uncertainty about future and goals and feeling a lack of progress provided the white students' central reasons for contemplating leaving Minority students' responses to the open-ended question "Can you give me an idea why some graduate minority students who started out with your department dropped out?" give some sense of the magnitude of the problem Little faculty support emotionally or intellectually accounted for 39 percent of the reasons offered

The severity of the responses in this study, and the profound implications they have for policy makers addressing these issues, make it especially frustrating that there continues to be such a lack of comprehensive data on these questions The Commission's ongoing work in determining the feasibility of assessment procedures to measure student, faculty, and staff perceptions of these more qualitative assessments of the "campus climate" holds promise for addressing this deficiency (California Postsecondary Education Commission, 1990e)

7. Housing and student support services

Little comprehensive research has been conducted on this topic, although it is known that on-campus housing for graduate students is limited across the University system and off-campus housing costs have risen substantially in the past ten years Rising housing prices force students to either absorb higher housing costs or live further away from campus, decreasing informal interaction within their departments, or at least making it more inconvenient This can result in particular hardships for low-income students, who are least able to cope with housing costs around many University campuses

In 1988, 41 percent of graduate students had one or more dependents, many of whom were children In 1987-88, all campuses had child care services, but with the exception of Berkeley and Santa Cruz, the facilities served faculty, staff, undergraduates, and the community, in addition to graduate students. The effect is predictable In 1987-88 at UCLA, only 2 5 percent of all graduate student parents found space in the campus child care facilities for their children Systemwide in that same year, there were 599 students' children served by campus child care and 877 students' children on waiting lists For those students who could find space in campus child care the costs averaged around $400 per month, or $4,800 per year Significantly, in 1988 proportionally more historically underrepresented degree recipients than Whites reported responsibility for dependents -- and these were the students who made it through to complete their degrees It is not known how many students may have withdrawn from doctoral programs in part because of the costs associated with providing dependent care while they were enrolled in school

8. The professional job market

When faculty were interviewed by staff from the Office of the President on the reasons for the lengthening of time to degree, many named the academic job situation as a major factor (Appendix B)

The University's general finding has been confirmed by other research on this topic Specifically, David Breneman (1971) maintained that the "quality" of new doctoral recipients and the academic departments from which they come (as measured by the academic community), are largely dependent on the prestigiousness of the job placements obtained by the doctoral recipient When the job market for fac-

ulty positions tightened during the 1970s, especially in the arts and humanities, graduate enrollments at the University of California redistributed internally toward fields with more favorable job prospects, but remained relatively stable overall. Since the number of prestigious job opportunities dwindled during this period, time to degree grew as students took additional time to make their resumes more attractive so they could compete for good jobs in a bad market

Faculty had no reason to resist this trend, because up to a point the State continued to provide resources for these students. More importantly, if doctorates from a department entered the labor market and could not find employment, or took less prestigious appointments, the prestige of the department (and hence the faculty) would suffer This is probably the biggest reason explaining the growth of postdoctoral appointments during this period What had previously been the apex of student achievement in the sciences has become the minimum qualification for entry level faculty positions and has added two years to the faculty employment process It is also noteworthy that those disciplines that experienced the largest increase in time to degree also had the tightest job markets On the other hand, jobs were readily available for doctorates in engineering and computer science during this period, and time to degree in these disciplines actually decreased

Next steps

It is the Commission's intention to continue to pay attention to these issues as the University of California moves forward in its planning for graduate education University officials currently plan to present a new planning document for graduate education to the Regents in January 1991 As part of the review of that document, the Commission will seek to address itself to a more comprehensive and integrated discussion of graduate education, including issues of time to degree, than was possible before completion of the University's plan By proceeding in this way it will be possible for the Commission to address the interrelatedness of the issues involving graduate education within the framework of the University's own plans.

At the time the Commission comments on the University's graduate education plan, it will offer specific recommendations -- if necessary -- on the broad range of issues confronting graduate education, including graduate time to degree, attrition, and diversification of the student body and faculty

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Appendix A: Senate Concurrent Resolution 66 (1989)

Senate Concurrent Resolution No. 66

RESOLUTION CHAPTER 174

Senate Concurrent Resolution No 66—Relative to doctoral degrees issued by the University of California.

[Filed with Secretary of State September 21, 1989]

LEGISLATIVE COUNSEL'S DIGEST

SCR 66, Hart. California Postsecondary Education Commission study of and recommendations regarding doctoral degrees issued by the University of California.

This measure would direct the California Postsecondary Education Commission to determine whether there has been an increase in time to completion of doctoral degrees awarded by the University of California, to study factors that have led or may lead to an increase in time to completion of doctorates, and to make recommendations, as specified.

This measure would require that the California Postsecondary Education Commission study and make recommendations regarding methods of increasing the number of minorities and women awarded doctoral degrees by the University of California, as specified.

WHEREAS, The State of California's public postsecondary education institutions exist to serve and educate all Californians, and

WHEREAS, Each year the racial-ethnic composition of the state's population becomes increasingly heterogeneous and the composition of student bodies of our universities becomes more diverse, and

WHEREAS, The nation's postsecondary education institutions are anticipating extensive faculty retirements by the year 2000; and

WHEREAS, As a result of the expected faculty retirements, California's public postsecondary education system anticipates needing at least 34,000 new postsecondary faculty, such that the University of California projects hiring at least 6,000 new faculty and the California State University projects hiring at least 8,000 new faculty; and

WHEREAS, This presents an opportunity to diversify the faculties of our postsecondary institutions by hiring more minority and women Ph D 's, who have been historically underrepresented, and

WHEREAS, It is the unique function of the University of California to grant doctoral degrees to those distinguished and qualified individuals who will comprise a significant portion of the new faculty applicant pool, and

WHEREAS, It is crucial that a substantial number of minorities and women have the opportunity to be awarded doctoral degrees in the next decade so that the postsecondary institutions of California

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and the nation have a broad range of candidates from which to choose for the replenishment of faculty positions, and

WHEREAS, There have been recent reports indicating that the time to completion of doctoral degree programs has increased, such that students now take longer to earn doctorates; and

WHEREAS, The decreased rate of progress toward doctorates may signal coming shortages of teachers, scientists, and other professionals, now, therefore, be it

Resolved by the Senate of the State of California, the Assembly thereof concurring, That the Legislature hereby directs the California Postsecondary Education Commission to determine whether there has been an increase in time to completion of doctoral degrees awarded by the University of California, and to study the factors which have led or may lead to an increase in time to completion of doctorates, and to make specific recommendations relative to methods of increasing the rate of progress toward receiving doctoral degrees awarded by the University of California without compromising the integrity of the academic process; and be it further

Resolved, That the California Postsecondary Education Commission shall address in its study and recommendations at least each of the following areas:

(1) A comparison of doctoral programs to professional programs including an examination of the institutional and social changes affecting those programs.

(2) Increases in the financial burdens students face in earning doctorates and ways of reducing these financial pressures, including an examination of financial support packages and housing,

(3) Increases in the professional burdens students face in earning doctorates and ways of reducing these professional requirements, including an examination of teaching and research commitments and publication requirements necessary for career placement;

(4) Alternative methods of restructuring doctoral programs to streamline degree requirements and reduce time to completion of degree if found necessary, including, but not limited to, a study of any alternative methods being utilized by the University of California and other major research universities in the United States or elsewhere; and be it further

Resolved, That the California Postsecondary Education Commission shall also study and make specific recommendations relative to methods of increasing the number of minorities and women awarded doctoral degrees by the University of California and shall address in its study and recommendations at least each of the following areas

(1) The recruitment of minorities and women into doctoral degree programs, including an examination of undergraduate preparation, academic research internships, and mentoring by faculty,

(2) The retention of minorities and women in doctoral degree programs, including an examination of degree requirements, financial support packages, teaching and research commitments, housing, length of time to completion of the degree program, counseling and advisement, and mentoring by faculty;

(3) The career placement of minorities and women awarded doctoral degrees, including an examination of the career placement within the University of California and the California State University, and be it further

Resolved, That no later than 12 months after the enactment of this resolution, the California Postsecondary Education Commission shall submit the results of its study, including specific recommendations, to the Legislature, the Regents, President, and Chancellors of the University of California, the Trustees, Chancellor, and Presidents of the California State University, the Board of Governors of the California Community Colleges, and to the governing bodies of the members of the Association of Independent California Colleges and Universities; and be it further

Resolved, That the Secretary of the Senate shall transmit a copy of this resolution to the California Postsecondary Education Commission, and the governing body for each segment of public higher education in California.

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Appendix B

University of California ◆ Office of the President

FACTORS AFFECTING COMPLETION OF DOCTORAL DEGREES AT THE UNIVERSITY OF CALIFORNIA

A Report Prepared in Response to
Senate Concurrent Resolution 66 (Hart, 1989)

November 1990

FACTORS AFFECTING COMPLETION OF DOCTORAL DEGREES AT THE UNIVERSITY OF CALIFORNIA

A Report Prepared in Response to
Senate Concurrent Resolution 66 (Hart, 1989)

University of California
Office of the President
Fall 1990

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Executive Summary

FACTORS AFFECTING COMPLETION OF DOCTORAL DEGREES AT THE UNIVERSITY OF CALIFORNIA

The University of California's Response to Senate Concurrent Resolution 66 (Hart, 1989)

Expressing legislative concern about the need to diversify California's postsecondary faculties in the coming years, Senate Concurrent Resolution 66 (Hart, 1989) requested the California Postsecondary Education Commission (CPEC) to report the time to completion of doctoral degrees at the University of California, the factors affecting the length of time, and methods of increasing the number of minorities and women awarded UC doctoral degrees. The Resolution (see Appendix D) contains the following requests for information:

> Resolved, ... That the Legislature hereby directs the California Postsecondary Education Commission to determine whether there has been an increase in time to completion of doctoral degrees awarded by the University of California, and to study the factors which have led or may lead to an increase in time to completion of doctorates, and to make specific recommendations relative to methods of increasing the rate of progress toward receiving doctoral degrees awarded by the University of California without compromising the integrity of the academic process; and be it further
>
> Resolved, That the California Postsecondary Education Commission shall address in its study and recommendations at least each of the following areas:
>
> (1) A comparison of doctoral programs to professional programs including an examination of the institutional and social changes affecting those programs;
>
> (2) Increases in the financial burdens students face in earning doctorates and ways of reducing these financial pressures, including an examination of financial support packages and housing;
>
> (3) Increases in the professional burdens students face in earning doctorates and ways of reducing these professional requirements, including an examination of teaching and

research commitments and publication requirements necessary for career placement;

(4) Alternative methods of restructuring doctoral programs to streamline degree requirements and reduce time to completion of degree if found necessary ....

Resolved, That the California Postsecondary Education Commission shall also study and make specific recommendations relative to methods of increasing the number of minorities and women awarded doctoral degrees by the University of California and shall address in its study and recommendations at least each of the following areas:

(1) The recruitment of minorities and women into doctoral degree programs, including an examination of undergraduate preparation, academic research internships, and mentoring by faculty;

(2) The retention of minorities and women in doctoral degree programs, including an examination of degree requirements, financial support packages, teaching and research commitments, housing, length of time to completion of the degree program, counseling and advisement, and mentoring by faculty;

(3) The career placement of minorities and women awarded doctoral degrees, including an examination of the career placement within the University and the California State University.

In consultation with the author of SCR 66, CPEC and the University of California (UC) agreed in the following way to share the responsibilities for conducting the research necessary to illuminate these issues (see letter in Appendix E): CPEC agreed to prepare a report sketching the issues surrounding doctoral time to degree from a national perspective; UC agreed to report on issues and factors affecting doctoral studies, including issues of graduate recruitment and completion of degrees, particularly as they affect minorities and women on its campuses; both institutions agreed to collaborate on recommendations to the Legislature.

The University welcomes the policy discussion heralded by SCR 66, and regards the Resolution as an ideal opportunity to examine with state policy-makers the goals and processes of graduate education planning. The University's response to the requests in SCR 66 is part of a series of efforts undertaken to examine graduate education rigorously in several phases. One phase involved an examination by UC faculty of the issues affecting minority graduate students: in February 1990, the President convened the All-University Faculty Conference on Graduate Student and Faculty Affirmative Action,

involving faculty, administrators, Regents, and Chancellors. Recommendations from participants in that conference may be found in Appendix F. Another ongoing effort is the work of the Joint Advisory Committee on Graduate Student Support. This joint administrative-Academic Senate Committee, convened by the Office of the President at the request of the Academic Council, will complete its report in the Fall of 1990.

A second phase has involved the investigation of factors related to the graduate student experience, particularly as the affect time to degree. A major portion of the University's response to SCR 66 emerged from this phase of the study (see Part I). To analyze doctoral degree production, time to degree, and student characteristics, this research involved reviewing historical trends in data provided by the National Research Council (NRC); interviewing approximately 300 doctoral students on the nine campuses and from the major groups of disciplines; and consulting with faculty, members of the Graduate Council, the Graduate Deans and their staffs on each campus; and selecting relevant available data from campus studies to illustrate specific findings. An important and gratifying aspect of this phase has been the increased and animated interest taken in the issues on UC campuses. This interest has already begun to yield the reflective and thoughtful self-study necessary to introduce change, and has led to discussions about the nature and needs of graduate education that will serve as a useful basis for the formal consultations with the campuses that follow publication of a report such as this one (see Recommendations section).

A third phase of the University's review of graduate education has focused on revision and updating of the graduate enrollment planning document, providing enrollment projections through 2005-2006, and taking into account the findings from the first two phases. The 1990 planning document will address future job market needs for doctoral degree holders in various fields, the University's role in helping to meet those needs, and the University's need for a suitable enrollment balance to assure programmatic strength. The report will also address the productivity issues raised in the second phase, including time to degree and retention; UC goals for recruitment of underrepresented minorities and women; and needs for graduate student support. The latter will be addressed in the report of the Joint Advisory Committee on Graduate Student Support. Another associated report will present the initial results of the University's new reporting system on placements of new UC doctoral degree recipients. Formal consultation with campuses on the graduate enrollment planning document is in progress. The final report is expected to be presented to the Regents at their November 1990 meeting.

In response to SCR 66, the University presents in the following pages findings from the larger study (phase 2) that are specifically related to the strong legislative concerns voiced in the Resolution regarding preparation of minorities and women. The University's report for SCR 66 has two parts, each directed to specific requests in the Resolution. These two parts are followed

by a section with recommendations and a section with supporting displays and other appendices. The two parts approach the issue of minority and women graduate students from two complementary viewpoints. The first places the experiences of minority and women within the larger frame of graduate education as a whole; the second focuses particularly on the problems identified for minority and women graduate students and discusses the University's efforts to address these problems as well as needs remaining to be met.

Part I. "Doctoral Education at the University of California and Issues of Time to Degree: Their Impact on Minorities and Women." addresses the requests for information detailed in the first two "resolved" paragraphs of the Resolution. This part includes an overview of doctoral programs at UC, including the five phases of a doctoral program; a discussion of differences in requirements associated with doctoral programs in different groups of disciplines, including a comparison of those in academic programs and professional schools; a review of trends in doctoral degrees and the distribution of degrees by field, age, gender, and ethnicity; a review of changes over the past twenty years in the amount of time students take to complete degrees; and a discussion of factors that influence time to degree and completion of degrees, particularly as they affect minorities and women. These factors include, but are not limited to, financial factors and professional activities (such as publishing research and attending professional meetings).

Part II. "UC Strategies for Recruitment and Reduction of Time to Complete Degrees for Minority and Women Doctoral Students." discusses issues affecting recruitment of minorities and women into graduate school and the University's programmatic efforts to improve recruitment and timely completion of doctoral degrees for these students. This part of the report addresses the requests for information detailed in the third "resolved" section of the resolution.

Recommendations presents conclusions and recommendations which emerge from the findings of the analyses presented in Parts I and II.

Appendices. For ease of reference throughout Parts I and II (which draw on many of the same displays), the relevant tables and graphs have been included in Appendix I. Appendices for all other sections of the document are also included.

At this time, the University is not yet ready to report Universitywide findings on two issues requested by the Resolution. One is an issue on which

comprehensive information will become available only after more time has elapsed: retention of graduate students. The University's graduate student data system has not been in place long enough to yield meaningful data in this area. Beginning two years from now, the University will have a sufficient number of years of data to begin tracking trends in retention and degree completion of women and minorities. The report does provide, however, illustrative information on doctoral completion rates from available campus studies (see Part I). On the second issue--career placement--the University's first annual Universitywide report on initial placement of new recipients of doctoral degrees will be available in late 1990. As recommended in its 1987 graduate enrollment planning document, the University has developed a career placement reporting system that will provide regular reports on the initial placement of new doctoral recipients, including information by gender, ethnicity, and discipline. The first report will be issued in Fall 1990 in conjunction with the graduate enrollment planning document. Thus, as annual data accumulate, the University will be able to track trends in the placement experience of women and minorities.

The present report focuses on two principal factors involved in diversifying the professoriate in the next decade. One factor is the limited number of minorities and women, particularly in some fields, who choose to enter graduate school to prepare for academic careers. The second factor involves timely completion of doctoral degrees by these groups. The major findings discussed in Parts I and II regarding these factors are summarized below.

Successful diversification of the faculty in all disciplines rests, ultimately, on the size of the pool of qualified minority and women candidates for graduate school and the University's ability to recruit them. The number of women and minorities in this pool, at present, is very limited. It is even more limited in mathematics and science fields, since many minority and women undergraduates tend to cluster in certain disciplines--primarily the humanities, social sciences, and life sciences.

As Part II suggests, financial constraints may be one reason for the small numbers of minorities and women in the pool for all fields. In particular, many minority undergraduates do not feel that they can afford the cost of a doctoral degree program leading to an academic career and thus are unwilling to assume the financial and time burdens entailed by the pursuit of the degree. Many come from limited income families and may themselves have an accumulated indebtedness from their undergraduate degree programs, as well as obligations to support their own families. Another reason may be related to motivation and preparation: many minority undergraduates may be unaware of the benefits of academic careers; others may prefer to pursue non-academic careers; still others may feel academically under-prepared to pursue doctoral studies and academic careers. This means that increased effort are needed to inform, prepare, and motivate students at the undergraduate level.

Enlarging the size of the pool requires a variety of strategies to ensure that greater numbers of minority students are attracted to graduate school and academic careers, and that no significant barriers prevent them from attending. The University has developed a progression of programs (some in collaboration with the California State University) in an effort to encourage more minorities and women to embark on the lengthy road to a doctoral degree and academic careers. These recruitment efforts are described in Part II of this report. Two critical components characterize UC's graduate outreach programs: one is the early identification of talented women and minority undergraduates, so that they may be prepared for successful recruitment to UC; the second is mentorship by UC faculty (or faculty at the students' undergraduate institutions). More experience is needed before the impact on enrollment of these programs can be assessed, since they are relatively new and funding constraints limit them to relatively small numbers of students.

Timely acquisition of doctoral degrees, the minimum standard credential for university-level faculty positions, is another factor that profoundly affects the diversification of postsecondary faculty especially for the near future. The University's research, reported in Part I, indicates that the amount of time spent at UC campuses to acquire UC doctoral degrees has increased by approximately one year over the past two decades for all students in all fields combined. However, the increases are meaningful only in association with field of study, since time to degree is longer and has increased more in some fields than in others. For instance, as time to completion of degrees has increased approximately two years in the humanities and social sciences, this factor affects and will continue to affect the preparation of future minority and women faculty disproportionately as long as they remain clustered in these fields.

However, investigation into formal degree requirements and other professional requirements (e.g., postdoctoral work) for qualifying for faculty positions in various disciplines suggests that restructuring of doctoral programs would have little effect on helping these students complete their degrees more quickly. Instead, most influential in reducing the time it takes minorities and women to complete their doctorates at the University is the consistent and predictable availability of financial support throughout the degree program. Research identifies the following elements of financial support as the most critical: the availability of research assistantships during training for the degree; the awarding of fellowships, rather than loans or outside work, particularly during the dissertation study; and the provision of non-academic services such as low cost, convenient housing and child-care. The study also identified close supervision of graduate student progress, provided by mentoring during fellowships and research assistantships, as another important factor in degree-completion.
In order to assist minority and women doctoral students to complete their degrees as efficiently as possible, the University has developed a series of programs designed to provide mentoring and financial support at points found

to be critical in the completion of doctoral studies. This series of programs (described in Part II) includes mentored fellowships for the first two years of study, research assistantships (supplemented by teaching assistantships provided by campuses), and dissertation-year fellowships. Since these programs were developed recently, it is too soon to demonstrate effectively the actual impact of this series of support programs on timely completion of doctoral degrees. We know now, however, that limitations on federal and state funding have meant that predictable and consistent financial support packages reach relatively few minority and women students at this time. As postdoctoral work is an important prerequisite to some faculty appointments, the University has also established a fellowship program to bring talented minority and women doctoral recipients from across the country at UC for postdoctoral research in all fields.

The studies reported in Parts I and II support the following general conclusions and recommendations with respect to recruitment and timely completion of degrees:

(1) For its faculty to reflect the diversity of the state's population in future years, it is critical for the University to attract more underrepresented minorities and women into doctoral programs and academic careers, particularly in mathematics, science, and engineering, fields in which these students are the most severely underrepresented. Although the University has increased the numbers of minority and women graduate students in all fields over the past decade, the numbers of these students continue to be small. To increase the size of the pool, the University has recently developed a series of outreach and preparation programs, some in collaboration with the California State University, which are designed to identify talented minority and women undergraduates and master's level students, mentor them, and recruit them into doctoral programs at UC.

Recommendation: The Office of the President and campuses should work together, seeking funds as needed and as fiscal circumstances permit, to expand current outreach and recruitment efforts to attract minorities and women into doctoral programs in all fields.

(2) The overall length of time spent at UC to earn a doctorate has increased during the past twenty years by approximately one year. It has increased most in those disciplines which have traditionally had a longer time to complete the degree, most notably the humanities and social sciences. Since minorities and women tend to cluster in these fields, they are dispropor- ately affected.

Recommendation: UC faculty should examine various aspects of doctoral programs, particularly in the humanities and social sciences, to assist students to complete their degrees as expeditiously as possible.

Among other activities, this examination should include a consideration of ways to improve the mentoring and advising of graduate students; to integrate students better into the activities of the department and the discipline in all phases of their doctoral programs; and to promote a campus environment that supports diversity. The examination should, as well, review policies on teaching assistantships; consider approaches to ensure that students have apprenticeship opportunities in research; review program requirements; and review expectations of graduate student performance and of practices for disseminating information about these expectations to students.

(3) The findings of this study and the preliminary findings of the University's Joint Advisory Committee on Graduate Student Support conclude that financial support is perhaps the single most critical factor affecting the University's ability to assist doctoral students to complete their degrees in a timely fashion. In order to improve the University's overall efficiency in retention and timely completion of doctoral degrees, increases in support from many sources, including the state and the federal governments, will be necessary. The greatest impact of these funds would be achieved by expanding support in research assistantships for all doctoral students. Minority and women students would be among the major beneficiaries of this strategy.

Recommendation: UC should work with other doctoral institutions to influence federal and state policy in securing increased support, particularly in the form of research assistantships and other graduate assistantships, for all graduate students.

(4) As discussed in Part II, the University has found that a comprehensive, yet flexible, package of financial support targeted to various stages of the doctoral program, and based on satisfactory progress through the program, is the most effective means of ensuring progress to degree. The University has a program for supporting underrepresented minorities and women graduate students, who are in good standing, at key stages of doctoral studies. Currently there are insufficient funds to assure all qualified minority and women doctoral students a minimum of four years of financial support as envisioned by this comprehensive plan.

Recommendation: The Office of the President and the campuses should work together, seeking funds as necessary and as fiscal circumstances permit, to provide to as many minority and women students as possible packages of comprehensive support at a level competitive with other major universities. Such support should come in a form and at a time to serve educational and training goals, as well as to provide financial assistance. These combinations of financial and academic support should include mentored

fellowships for beginning doctoral students, research assistantships, teaching assistantships and fellowships to support dissertation studies, along the lines of the model provided by the Academic Career Development Program described in Part II.

(5) Non-academic services, such as low cost, convenient housing and child care are also critical to completion of doctoral degrees, since minorities and women graduate students are often older and have dependents.

Recommendation: The Office of the President and the campuses should work together, seeking funds as necessary and as fiscal circumstances permit, to expand non-academic services to greater numbers of graduate students.

As indicated above, several of the recommendations are directed to the campuses and faculty. These recommendations address the need to expand graduate recruitment efforts, the need to assess the effectiveness of supervision and mentorship, the need to review whether expectations for completing the degree can be restructured to improve time to degree, and the need to study issues with respect to a supportive academic and campus environment for all graduate students. Campuses and appropriate faculty will be asked to respond to these recommendations during the consultation process in the 1990 Fall term.

The University's successes in increasing the diversity of the undergraduate student body will lead to some increase in the pool of minority and women candidates for graduate school, since more of these students will be completing baccalaureates. The University also recognizes its responsibility not only to increase the numbers of minorities and women completing baccalaureates, but also to encourage more of them to pursue doctoral degrees and academic careers. However, it is clear that improvement in non-financial factors alone is not enough. Improved financial support for graduate students is a critical factor in maintaining and enlarging the pool of qualified and interested minority and women candidates for graduate school and the timely completion of doctoral degrees for all students.

Part I

Doctoral Education at the University of California and Issues of Time to Degree: Their Impact on Minorities and Women

PART I

Doctoral Education at the University of California and Issues of Time to Degree: Their Impact on Minorities and Women[1]

Introduction

Time to degree has become a major issue among Graduate Deans and at the University of California, during to the current need to diversify faculty and the impending shortage of doctorates, particularly in science and engineering fields. The following study responds to Senate Concurrent Resolution 66 (Hart, 1989) by examining time to degree at the University of California. The study determines whether students take longer to complete their doctoral degrees than they did twenty years ago, and if so, what factors may have led to the increase in time. Ethnic minorities and women are a special focus of every stage of the analysis. The report sets forth each of these issues as they affect all graduate students, then focuses on differences in experiences of women and minorities in comparison to those of graduate students as a whole.

During the preliminary stages of this study, it became clear that many factors which promote timely and successful completion of a doctoral program affect all students, regardless of race, ethnicity, sex, or age. Factors such as a student's field, the circumstances under which research is practiced and taught, and student financial support influence time to degree and completion of the doctoral program. To ascertain whether ethnic minorities and women face particular problems, this study first addressed the underlying structural reasons for prolonged time to degree among all students. This study then examined how these factors particularly influence ethnic minorities and women at each stage of a doctoral program.

[1]This report is based on a year of research and consultation with the University of California campuses, conducted by Dr. Maresi Nerad, located in the Office of the Graduate Dean on the Berkeley campus. Dr. Nerad was selected as consultant to the project based on her extensive experience, which included working with the Graduate Dean on the Berkeley campus on this and associated issues. This report highlights portions of her research relevant to the change in SCR 66 to examine factors influencing time to doctoral degree, especially as they affect women and minorities.

This study used three sets of sources:[2] (1) Historical data from the National Research Council collected annually from a nationally distributed questionnaire of recently completed doctorates, were used to analyze degree production, time to degree, and student characteristics. (2) Interviews with about 300 doctoral students from the nine campuses and from every major field of study. In addition, consultations with faculty, members of the Graduate Council, the Graduate Deans, and their staff on each campus. (3) Selected report findings from individual campuses were added to illustrate specific conclusions. In all, the study included a period of four months of intensive consultation with faculty and doctoral students by the researcher. It might be noted that the process of visiting campuses for three days of interviews already has heightened faculty's concern about prolonged time to degree and has engaged the Graduate Councils on some campuses in developing constructive strategies for shortening time to degree. The visits also influenced departments in considering additional support activities for their students, and led Graduate Divisions to invest even more effort in analyzing their students' progress.

Because time to degree is such a complex problem, this report begins in Section I with a description of the five stages of a doctoral program. Section II presents the production of doctorates awarded by the University of California to all students and includes a special focus on women and ethnic minorities. The increased number of degrees awarded over time and the clustering of minorities in certain fields are shown. Section III illustrates the characteristics of the doctoral student body by age, marital status, dependents, and type of undergraduate school. Section IV analyzes the length of time students took, on the average, in 1968, 1978, and 1988, to obtain a doctoral degree. The major factors influencing time to degree, such as research training and funding, degree and teaching requirements, faculty advising, financial burdens and financial support, and post-doctoral career paths are analyzed in Section V. Doctoral student attrition is addressed in Section VI.

Brief definitions of terms are in order: Ethnic minorities include Asian Americans, African Americans, American Indians, Chicanos, and Latinos. The term non-Asian minorities has been used to refer to all of the above except Asian Americans. When describing minority students, this study has excluded foreign students or non-U.S. residents. When this report refers to women or

[2]Appendix B describes the data sources and methods for this report, including for the extensive interviews with faculty, graduate students, and administration conducted at each UC campus. A special outcome of this approach was to give visibility to issues and problems connected with graduate education, and to promote the start of discussions on how to make improvements. UC expects that the full time to degree study, with detailed recommendations to the campuses, will stimulate long-term attention to the issues raised and activities that will improve graduate education.

men doctoral students, foreign students are included unless otherwise noted. The various doctoral programs were grouped into six major fields of study: arts and humanities, engineering, life sciences, physical sciences, professional schools, and social sciences. Appendix A lists programs included in each major field.

I. The doctoral degree program: The Five Stages of a Doctoral Program

Strictly speaking, a doctoral degree program consists of four distinct stages: (1) taking courses; (2) preparing for and taking the qualifying examination; (3) finding a dissertation topic and writing a dissertation prospectus; and (4) undertaking the research and writing of the dissertation. (5) For this study, however, a fifth stage--applying for a professional position--has been added, given that the majority of students look for jobs while in graduate school. Interviewed faculty and students agreed that the absence or presence of a job offer has an impact on the time to completion of a degree.

1. First Stage: Taking Courses

In the first stage of a doctoral program, students develop an advanced level of familiarity with their field. During this stage, students specialize within the field and make connections with areas outside the field. For the most part, students study in seminars or reading courses, under independent study, or on laboratory research projects led by faculty. Graduate students rarely take large lecture courses, unless they need an overview of a new area or a review of a minor subject area.

Each doctoral program establishes its own set of requirements, in terms of the number of courses and their content, as well as the form, sequence, and number of examinations. For example, many engineering and physical science programs require a series of written or oral examinations at the end of the first year, known as the "prelims." The social sciences, humanities, and professional schools rarely require examinations at the end of the first year. Another distinction among the programs, even in the same disciplines across the UC campuses, is the flexibility of course requirements. One example is between Electrical Engineering at Davis, which requires a fixed sequence of courses, and Electrical Engineering and Computer Science (EECS) at Berkeley, which has no specified course requirements at all. In the Electrical Engineering and Computer Science department at Berkeley, a group of Electrical Engineering faculty determines what particular courses are useful for each student. In contrast, most social science programs not only require many courses within the field, including methodology courses, but also demand that courses be taken in other fields.
Programs also differ considerably in their foreign language requirements. Humanities fields usually require between two and three foreign languages, as

is the case in most English programs, Asian History, Art History, and Music. The social science fields, on the average, require one foreign language. Most life sciences, engineering, and physical science programs require no foreign language. Mathematics is an exception, requiring at least one, if not two, foreign languages.

2. Second Stage: Preparing and Taking the Qualifying Examination

All programs have the qualifying examinations in common. This series of examinations, however, varies widely in form, length, and the time at which it is taken. Most programs include an oral component.

For the humanities, social sciences, and professional schools, this examination usually consists of two parts: (a) written examinations or three major papers, and (b) a one-and-a-half hour to three-hour oral, ranging in subject from any area possible in the field to specific questions on the area of the dissertation. Science and engineering students are often required to design one or two research proposals other than their dissertation for this examination. The oral portion is usually a presentation of dissertation work that the student has already accomplished.

After passing the qualifying examination, often no later than the semester following the exam, students are advanced to candidacy. After this point, students take no more required courses, or only those directly related to their dissertation research.

3. Third Stage: Finding a Dissertation Topic and Adviser, and Writing a Dissertation Prospectus

This stage of the doctoral program has two parts: (a) deciding on a topic and choosing the faculty major adviser--this choice must be made before advancement to candidacy, but may already be determined during the first year--and (b) writing a dissertation proposal or prospectus.

For most students the processes of deciding on a topic and on an adviser go hand in hand. Some students enter a doctoral program with a precise idea of both topic and faculty adviser. Others develop their specific interests while taking courses, and students who are part of a laboratory research team may select a portion of the larger project to be their dissertation research. Still others select an adviser before choosing a topic. These students base their decision on the anticipation of a good working relationship with this faculty member, regardless of whether their interest matches that of the faculty member. Their choice of topic afterwards may or may not reflect the interest of that faculty member. Others, more pragmatically, choose the faculty

member who has enough grant money to support students. In addition, there are those students invited by certain faculty to study under them.

Many programs require a dissertation prospectus to be presented at the time of the qualifying exam or shortly thereafter. A prospectus is usually an outline of the proposed dissertation research. It includes a statement of the problem, a review of the literature, and a discussion of the methodology used. Its length can vary from 5 to 40 pages.

4. Fourth Stage: Undertaking the Dissertation Research and Writing

The actual research stage is predetermined by the discipline. Each major field has its distinct way of conducting research. In the physical sciences, engineering, and molecular and cellular life sciences, research is practiced in a laboratory, most likely on campus. Some physics or chemistry students may have to travel to major national laboratories for the use of specific facilities such as accelerators or light sources. The work in these disciplines is often performed by a team. The exceptions in these fields are students in theoretical physics, mathematics, and statistics, who study alone, without laboratories or highly technical equipment.

Students in the life sciences who study entire organisms often observe plants or animals in their natural habitats, which may be at distant locations. Their research may also be limited to certain seasonal conditions and it is often an solitary process. Many social sciences and professional discipline students may do research in the field, at home or abroad, normally spending a year on field research. They usually work alone. Humanities students typically do research in libraries and archives, reading and analyzing texts. They may take occasional trips to major libraries or archives, but today, many texts are available on microfilm in the campus libraries. Their research mode is an individualistic one.

The second phase of the fourth stage, the writing of the dissertation, is a difficult period in all fields. As the most crucial requirement for the doctoral program, the dissertation demands consistent and continual attention. The writing process itself is time-consuming and all-absorbing; moreover, successful organization and presentation of the author's original ideas depend especially on a significant amount of time thinking about and analyzing the research material before a word can be written. During this critical stage, the availability of funds to cover both the research expenses and the cost of living while writing are essential or the graduate student will be distracted by the demands of working to earn support money. Yet, in the humanities, social sciences, and professional fields, financial support for the dissertation writing stage is usually absent. In addition, the isolated nature of research in these fields may also contribute to lengthened time to degree.

5. Fifth Stage: Applying for Professional Employment

During the final stage of the dissertation program, the student begins the search for professional employment. In many fields, students make the first academic job connections at annual national conferences. The large professional associations, such as the Modern Language Association (MLA) or the American Educational Research Association (AERA), list job openings and conduct initial job interviews at the conference site.

This stage comprises several components: the search for open positions, the writing and presentation of a research talk, the construction of a curriculum vitae and the forming of a dossier, and preparation for an on-site job interview. For academic positions, a campus interview for a faculty position is often a three-day event.

Traditionally, for many life and physical science students, the next step is a post-doctoral research position. The impact of the post-doctorate is discussed in more detail, below. In placement for all positions, particularly academic positions, the letter of recommendation from the dissertation adviser plays an essential role in the hiring process.

* * * * * *

These five stages move a graduate student through a series of roles and related levels of expertise and, like all learning situations, occasion some anxiety and difficult adjustments, as well as positive rewards from the excitement of research and teaching. In this respect, the expectations are the same for all graduate students--men and women, minorities and whites. (Where experiences of minorities and women may differ from those of graduate students as a whole is examined in more detail in the following sections, and University strategies to deal with these differences are elaborated in Part II.) These five stages, then, are common to all graduate students earning doctoral degrees. Consequently, this study will continue to refer to these five stages throughout the report.

II. Doctoral degrees awarded by the University of California: 1968, 1978, 1988

A. Increase in Degree Production: 1968-1988

According to the NRC data, the number of doctorates awarded by the University of California between 1968 and 1988 increased by 59% from 1,444 in 1968 to 2,295 in 1988. The increase was not steady. In the first ten years, the number of doctorates rose by 37%, but in the second ten years, this number rose only by 16% (**Graph 1 and Table 1**). This trend at the University of California follows the national trend, where the number of students earning

doctoral degrees increased rapidly in the 1960s, peaked in the mid-1970s, declined through the late 1970s, stabilized until the mid-1980s, and is rising now.

Although the number of doctorates nearly doubled over the 20 year period, it did not increase proportionally in all major fields of study. The rise in number of doctorates was most pronounced in engineering (136%), next in the arts and humanities (113%), followed by life sciences (63%), and social sciences (61%). Physical sciences had the smallest increase, at 29%, and the professional fields showed a decrease in the number of degrees awarded (-8%), entirely owing to a decrease in Education degrees (-26%) (**Table 1 and Graph 1**).

Although the number of doctoral degrees awarded in engineering, physical sciences, and life sciences increased in both decades, the number of degrees awarded in other large groups declined slightly in the second decade, 1978-1988. In engineering and computer science, however, degree production accelerated from a 46% increase between 1968 and 1978, to a 61% increase between 1978 and 1988. The physical sciences experienced an increase of 7% from 1968 to 1978, and a 21% change from 1978 to 1988.

During the twenty year period, the number of doctoral degrees awarded to women rose substantially, up 293% from 166 in 1968 to 653 in 1988, while the number for men awarded degrees only rose 31% from 1,094 in 1968 to 1,430 in 1988. Both men and women showed a greater percentage increase in earned doctorates from 1968 to 1978 (women at 155% and men at 28%) than during the 1978 to 1988 period (women at 54% and men at 2%). The number of men earning doctorates stayed almost the same between 1978 and 1988. Women earned 166 out of 1,260 degrees, or 13% of all degrees in 1968. In 1978, they earned 423 out of 1,828 degrees (23%), and 653 out of 2,083 degrees (31%) in 1988 (**Table 1**).

The number of degrees awarded to minority students in 1988 (274 degrees) rose substantially, 44% from 1978 (190 degrees). The increase in number of degrees awarded to white students during the same period was only 7%. Doctoral degrees awarded to American Indian students increased from 1 to 9 doctorates, and doctorates awarded to Chicano and Latino students increased 49%. In 1978, minorities earned 11% of all domestic (U.S. citizens and permanent residents) doctoral degrees awarded, and in 1988 they earned 15% of all domestic doctoral degrees (**Table 2**).

B. Distribution of Degrees Earned by Women, Minorities, and Major Fields of Study

Changes over Time

In 1968, 1978, and 1988, the majority (60%) of UC doctoral degrees were awarded in the life sciences, physical sciences, and engineering programs. This proportion has not changed much over time. While proportionally fewer students earned a degree in the physical sciences in 1988 (21%) than did students in 1968 (26%), proportionally more students earned engineering degrees in 1988 (18%) than in 1968 (12%) (**Table 1**).

Within the remaining fields, a change occurred principally in the professional degrees conferred. Fewer students earned doctoral degrees in professional fields in 1988 than in 1968, and proportionally more students earned degrees in the arts and humanities in 1988 than in 1968, at a 4% increase. The proportion of students earning doctoral degrees in the social sciences remained the same.

Distribution of Degrees by Women

Men and women selected different fields of study. During the period 1980 through 1988, 72% of women, including minority women, earned doctorates in relatively equal proportions in the life sciences (28%), arts and humanities (22%), and social sciences (22%). Smaller proportions of women doctoral recipients earned their degrees in the physical sciences (11%) and engineering and computer sciences (3%). The remaining 14% earned degrees in one of the professional fields (**Graph 2**).

Men, including minority men, in contrast, earned the majority of their degrees in the physical sciences (26%), the life sciences (24%), and engineering and computer sciences (19%). Men in smaller proportions earned degrees in the social sciences (14%), arts and humanities (11%), and professional field programs (6%).

In all areas of study, there was an increase in the number of women receiving degrees from 1968 to 1988. Over time, few changes have occurred in how men and women doctoral recipients are distributed by discipline. The numbers of women doctorates in engineering and the physical sciences remain low. For men, the number of degrees received over time increased the most in engineering, while it decreased only in the professional fields (**Table 1**).

Distribution of Degrees by Minorities

Between 1980 and 1988, American Indian, African American, Chicano, and Latino degree recipients were clustered in the life sciences, social sciences, arts, and humanities. African Americans and Chicanos also earned a high proportion of their degrees in professional fields, 24% and 20%, respectively, while American Indians and Latinos earned a higher proportion of their degrees in the physical sciences, 22% and 15%, respectively. During 1980-1988, Asian Americans earned degrees in engineering (29%), physical sciences (23%), and life sciences (25%) (**Graph 3**).

Over the last ten year period, American Indian, African American, Chicano, and Latino students shifted their interest of study. In 1988, proportionally more non-Asian minority students earned their degrees in the life sciences and physical sciences than in 1978, and fewer students proportionally earned their degrees in the social sciences, professional fields and arts and humanities. The number of non-Asian minority doctorates in engineering remained small. In 1988, proportionally more Asian Americans earned doctoral degrees in engineering, arts and humanities, and social sciences than in 1978, and earned proportionally fewer degrees in the life sciences, physical sciences, and professional fields (**Table 2**).

* * * * * *

In summary, women and minorities steadily earned more degrees across all fields during this time period. Women, including non-Asian and Asian minority women, tend to be more concentrated in the life sciences, the social sciences, and arts and humanities, while men, including non-Asian and Asian minority men, tend to be more concentrated in the physical sciences, engineering, and life sciences.

III. Characteristics of Doctoral Degree Recipients at the University of California

Before analyzing the factors influencing time to degree, this study will describe the characteristics of doctoral degree recipients and examine their changes over time. This section will provide an overview of changes in age, marital status, dependents, parents' educations, and type of undergraduate school of UC graduate students.

Age

In 1988, the average doctoral recipient completed the degree at 33.3 years of age. Degree recipients in 1988 were an average of one year older than in 1968. Those in professional fields were the oldest (38.0 years in 1988), followed by recipients in the arts and humanities (36.5 years in 1988). Degree recipients

were the youngest in the physical sciences and engineering (30.9 years and 31.3 years). These age differences reflect the different length in time students take in these fields to complete the degree (**Table 3**).

Although women in 1988 were on average two years older (34.6 years) than men (32.6 years), this represents a small decrease in age difference over time. In 1968, women were on average 2.4 years older than men.

In 1988, Asian American degree recipients were on the average slightly younger than white degree recipients (32.5 years versus 33.3 years). African American degree recipients were the oldest, at 37.3 years, and Chicanos and Latinos were on the average 34.1 years old. Compared to 1978, Asian American degree recipients were an average of 0.7 years older at completion of the doctorate in 1988, African Americans were 2.2 years older, and Chicano and Latino recipients 1.1 years younger. The same age variation among fields that existed for all degree recipients was apparent for minority degree recipients.

Marital Status

In 1988, overall, half (56%) of all doctoral recipients reported that they were married when they completed their studies. This was a slightly smaller proportion than in 1978 (59%). However, in 1968, over two-thirds of all students (76%) reported themselves as married (**Table 4**).

Among major fields, students in the professional fields constituted the largest proportion of married students (70% in 1988). This is not a surprise, since professional field students were also the oldest on average. However, engineering students, who were among the youngest on average, were also married in large proportions (61% in 1988). In the physical and life sciences, about half of all students were married and in the social sciences and humanities, the proportions were 56% and 58%. Over the last twenty years, proportionally fewer students were married in all fields.

Proportionally fewer women were married than men in both 1968 and 1988. In 1988, 53% of women students reported that they were married, as compared to 57% of men. However, this proportional difference has markedly changed during the last twenty years. In 1968, 79% of men degree recipients were married, but only 58% of the women. In 1978, 61% of men were married compared to 55% of women.

Among minority students, Asian Americans were the most likely to be married, both in 1978 and 1988 (68% in 1978, and 60% in 1988). Next followed Chicanos and Latinos, with 57% married. In 1988, Asians, Chicanos, and Latinos reported higher proportions than did white students, of whom 55% reported themselves as married, while African American degree recipients were least likely to be married (45%).

Dependents

In 1988, 41% of degree recipients reported having one or more dependents. About two-thirds (67%) of all professional field students reported having one or more dependents (**Table 5**). A correlation can be inferred between the fact that students in professional fields take the longest time to complete their studies and include the largest proportion with dependents. These students may need to take extra time owing to family responsibilities.

Fewer women than men reported having dependents. In 1978, 55% of men, but only 33% of women had one or more dependents. In 1988, the difference was still pronounced, but had diminished (from 46% to 29%).
Chicanos and Latinos were the minority group with the largest proportion having dependents. In 1988, 60% had one or more dependents. Of Asian Americans, 43% had dependents. Of African American students, 41% had dependents, while 35% of whites reported having one or more dependents. These statistics are especially significant for UC plans to increase minority participation in graduate education. As noted in Part II, to give these students an improved opportunity to complete doctoral studies successfully, they need sufficient support for family housing, child care, and other family responsibilities.

Type of Undergraduate School

In 1988, 32% of all UC doctoral degree recipients (U.S. citizens and permanent residents) received their undergraduate education at one of the eight comprehensive University of California campuses. Twelve percent received their bachelors from a California State University, and another 6% from California private universities. The remaining 50% completed their undergraduate studies at other US colleges and universities.

Except for engineering and the professional fields, there were few significant differences among fields in terms of undergraduate education. The proportion of engineering degree recipients receiving their undergraduate education at a CSU institution was small (6%). In contrast, of professional degree recipients, 19% of doctoral degree recipients came to UC with an undergraduate degree from a CSU institution. Arts, humanities, life sciences, and professional fields had notable proportions of minority students with undergraduate degrees from CSU. Overall, these proportions are similar for minority students and have changed little over time. An exception was the slight increase of non-Asian minority doctoral degree recipients with undergraduate degrees from a CSU institution in 1988 as compared to 1978. In 1988, a large proportion of African American doctoral degree recipients had undergraduate degrees from a CSU institution (30%).

This suggests the success of recruitment efforts by UC and the individual campuses, particularly in using the CSU "pipeline" (these efforts are detailed in Part II). These activities should expand in order to increase the number of minority students in programs.

IV. Time to doctoral degree: 1968-1988

A. Time Measures

Time to degree can be measured in three different ways: total time, elapsed time, and registered time. Traditionally, NRC uses the first two measures in reporting national figures on doctorate recipients. (1) **Total time** (BA to PhD) measures the time lapsed from the year that a student receives an undergraduate degree to the year that he or she completes a doctorate.[3] It includes the time a student may work after receiving the bachelor's degree and before entering graduate school. (2) **Registered time** to degree is defined as the time spent enrolled in graduate school. This is not a measure of minimum time, because it may also include time enrolled in a master's program. (3) **Elapsed time** is defined as the time from entrance to graduate school until the completion of the degree. This measure includes the time when students are unregistered and perhaps away from the campus. It also includes earning a master's degree. This study uses **the elapsed time**, that is, from entrance to graduate school to completion of degree. Unless otherwise specified, this third measure will be used throughout this report.

The analyses report mean time to the doctorate rather than median time because the mean is more sensitive to small changes in the yearly data. While mean values can be distorted by a few "long-time students," the population is large enough to be resistant to this distortion.

Overall, time to the doctorate at University of California increased over the last 20 years by about one year. It is the time from completion of the master's degree to completion of the doctorate that has increased. Neither the period of time from completion of the bachelor's degree to entrance to graduate school, nor the time necessary to receive the master's degree has increased especially. The average length of time during which students withdraw has decreased, owing to the establishment in 1978 of more restrictive policies on leaves of absence. **(Table 7).**

[3]Howard Tuckman (1989) argues that this measure is useful in determining how quickly the supply of new doctorates can potentially respond to changes in demand.

Master's Degree

In order to measure time to degree at the University of California, it is important to distinguish whether a master's degree is acquired during the course of receiving a doctorate and if so, whether this master's degree was acquired at the same institution as the doctorate. Aggregate NRC data, in all three time measures, do not distinguish whether the students received a master's degree on the way to the doctorate, nor whether this degree was received at the same institution as the doctoral granting one. Consequently the National Research Council data always show longer time to degree than the campuses' own data. By contrast, this section of the report presents time to degree data that reflect only the time spent at the doctoral granting institution. Therefore, for the University of California the NRC data have been rearranged in three groups: (1) students who did not receive a master's; (2) students who received master's degrees at an institution other than the PhD granting institution; and (3) students who received the master's at the same institution as the PhD (**Table 8**).

The findings are not surprising. Students with no master's degree take the shortest time. Students with the master's from another institution take the longest time, since the Ph.D.-granting institution rarely accepts a substantial portion of the prior course work in lieu of its own program. Students with a master's from the same institution complete the program in less time than those with a master's degree from another institution, but take longer than those with no master's degree. In this, all campuses were similar. Even for students transferring from one UC campus to another, few required courses are waived. Students who come with a master's from elsewhere are likely to take more courses voluntarily in order to gain familiarity with the faculty. Since the existing data do not specify the amount of time that the individual student spent elsewhere, this report will largely exclude the group of doctorates who received their master's at another institution. This group adds, on the average, two additional years that were spent at another campus (**Table 8**).

About two-thirds (70%) of all students acquire a master's degree before the doctorate. Half of these (35%) receive a master's degree at the same institution as that from which they receive the doctorate and the other half (35%) from a different institution. This has changed little over time (**Table 9**).

The proportion of students with or without a master's varies by major fields of study. About 90% of all degree recipients in engineering, professional fields, and the arts and humanities, and 80% in social sciences, acquire a master's degree, while about half of all life science and physical sciences students receive the Ph.D. without a acquiring a master's degree on the way.

B. Time to Doctoral Degree for Minorities and Women: 1980-1988

Because the number of minorities who received doctorates in 1978 was small, all minorities who earned doctoral degrees between 1980 and 1988 were combined and mean time was calculated. It is important to remember that Asian Americans are clustered in different fields than the other ethnic minority groups. Therefore, in comparison with whites, Asian Americans were treated as a separate group from African Americans, American Indians, Chicanos, and Latinos.

Overall, Asian Americans finished their doctorates faster than white students (8.0 years vs. 8.8 years). It should be noted that Asian Americans are clustered in fields with short time-to-degree. Yet, compared to whites, they had shorter time to degree in the professional fields (by 2.6 years) and in engineering (by 0.6 years). They had longer time to degree in the arts and humanities (by 1.3 years) **(Graph 4)**.

Non-Asian minorities, on the average, took about one year longer than white students to complete their degrees. They were, however, clustered in fields with long times to degree. It is not surprising then, that when the data were disaggregated by discipline, the differences in time between white and non-Asian minority degree recipients were only about half a year longer per discipline. In fact, non-Asian minorities in engineering, although still relatively few in numbers, completed their degrees faster on average than did whites (7.7 years vs. 7.9 years).

Women, overall, took 1.5 years longer than men. Like non-Asian minorities, women are clustered in fields with long time to degree. In a comparison with men, across disciplines, women in the physical sciences completed their degrees faster than men, and in the engineering and computer sciences and social sciences, they took longer than men by less than half a year. Women in the professional fields and arts and humanities took about a year longer than men **(Graph 5)**.

* * * * * *

These findings by discipline show time to degree levels for women and ethnic minorities that are not substantially different from men and whites. In fields where there are still proportionally few women or minority students, the data show that they can have a slightly shorter average time to degree than men or white students.

C. Increases in Time to Degree: 1968-1988

To ascertain whether the time to degree has increased over time, the time to the doctorate at the Ph.D.-granting institution was analyzed[4] for 1968, 1978, and 1988. Overall, mean time to the doctorate at the University of California[5] increased over the last 20 years by one year, from 6.7 years mean elapsed time in 1968, to 7.2 years in 1978, to 7.7 years in 1988 (**Table 10**).

1. Time Differences between Major Fields of Study

A substantial difference in time to degree among the major fields of study has existed historically. In 1968, the most substantial difference in mean elapsed time occurred between students in the physical sciences (5.4 years) and life sciences (6.0 years) versus students in the professional fields (11.3 years) and the arts and humanities (8.2 years). This difference in length of time between the fields has increased over time for the arts and humanities, but has decreased slightly for the professional fields (**Table 10**).

2. Time Increases by Major Fields of Study

The rate of increase in time has varied widely by major fields of study. In fact, in both engineering and the professional fields (due to decreased time in the field of education), the elapsed time has decreased. The time in engineering rose from 6.4 years in 1968 to 6.8 years in 1978, and dropped to 6.3 years in 1988. During the same period, the time in the professional fields decreased sharply from 11.3 years in 1968 to 9.2 years in 1978 and increased to 10.4 years in 1988.

The smallest overall increase occurred in the life sciences, with 1.1 years (6.0 years in 1968 to 7.1 years in 1988), followed by the physical sciences, with 1.2 years (5.4 years in 1968 to 6.6 years in 1988). The largest increase occurred in the arts and humanities, with 2.1 years (8.2 years in 1968 to 10.3 years in 1988), followed by the social sciences, with a 1.7 year increase (7.1 years in 1968 to 8.8 years in 1988). These trends closely resemble the national trends by major fields.

[4]Thus, the group of students who received their master's elsewhere were excluded.

[5]For the time comparison at UC, the group of doctorates who received their master's at other institutions was excluded.

As stated before, the differentiation between time measures revealed that the largest increase in time occurred in the registered time, not in the time away from campus when students were withdrawn or not registered. Professional field students spent the longest time away from school (2.4 years), humanities students up to 2 years, and social sciences students spent about 1.5 years withdrawn, mostly after advancement to candidacy. In contrast, students in the sciences spent, on the average, only half a year withdrawn (**Table 11**).

A study at UCB on reasons for withdrawal[6] shows that students interrupted their studies primarily for financial reasons (60%), secondly for personal reasons (30%) such as family problems, health or maternity leave, and thirdly, owing to job commitments (15%). Students often cited more than one reason. Information gathered from the interviews reinforced the Berkeley findings that, because of limited research funds, humanities and social sciences students are forced to spend greater time away from dissertation work, earning a living. This phenomenon was also reported by a recent national study On Time to the Doctorate by Tuckman et al.[7]

3. Time Increases for Women

Between 1968 and 1988, the overall mean time to doctoral degree for women increased less than for men (0.5 vs. 0.9 years). Women took less time to complete their degrees in engineering and in the professional schools in 1988 than they did in 1968 (by 2.3 years and 2.3 years); however, the numbers of women involved are very small. In the remaining fields, where substantially more women received degrees, the time has increased between 0.7 years (life sciences) and 2.6 years (arts and humanities) (**Table 10**).

Men's time has decreased in the professional schools and remained the same in engineering. In the social sciences, men's time increase was double that of women (2 years vs. 1 year). The arts and humanities showed an increase of 1.9 years for men.

Clearly, men and women both experienced increases in time to degree. Although change occurred at different rates, time for both men and women in the arts, humanities, social sciences, and physical sciences increased between 1 and 2 years.

[6]UC Berkeley, Graduate Division: Withdrawal statistics, 1987/88.

[7]Tuckman, Howard, Susan Coyle, and Yupin Bae, On Time to the Doctorate, (Washington D.C.: National Academy Press, 1990).

4. Time Increase for Ethnic Minorities

(Note: in comparing changes in time-to-degree between ethnic minorities and whites, it should be noted that the small number of Asian Americans, African Americans, American Indians, Chicanos, and Latinos in some major fields may result in distorted statistical figures.)

Asian Americans and whites had approximately the same overall time increase of half a year between 1978 and 1988. Overall, African Americans, American-Indians, Chicanos, and Latinos had a higher increase in time than whites and Asian Americans. Time increases varied between 0.8 and 1.8 years across the various disciplines for non-Asian minorities **(Table 12)**.

* * * * * *

In summary, time to degree increased for both men (including minority men) and women (including minority women) by approximately one-half year over the last decade (1978 to 1988). Over the two-decade period 1968 to 1988, time to degree for men increased by 0.9 years, while time to degree for women increased only 0.5 years. Time to degree for Asians and whites increased by approximately one-half year over the last decade (1978 to 1988), while time to degree for non-Asian minorities increased by 0.9 years over the last decade. Neither gender, nor ethnicity/race explain the overall increase in time to the doctorate.

It is important to look at field-specific reasons in order to explain the observed time increase for all students. In the following section, this study will examine why time to degree has risen at a higher rate in the arts, humanities, and social sciences than in engineering, life sciences, and physical sciences. In addition, the reasons for lengthy time to degree in the professional schools will be explored.

V. Factors Contributing to Lengthened Time to Degree

A series of factors, rather than a single factor, contributes to the lengthening in time both overall and by field of study. These factors can be divided into two groups, field-specific factors and institutional factors. This division is also based on the findings from a study on time to degree and attrition of doctoral students at UCLA by Ellen Benkin (1984). The author concluded that the

factor labeled students' "field of study" was more important than the students' demographic variables in determining degree completion.[8]

Field-specific Factors and Institutional Factors

There are distinct differences that impact time to degree between the physical sciences, engineering, and life sciences, on the one hand, and the arts, humanities, social sciences, professional schools, and on the other: (1) how research is conducted and taught, (2) how and to what extent research is funded, (3) how the doctoral program is structured, (4) whether foreign language competency is required, (5) what role the dissertation plays in doctoral training, (6) whether post-doctoral employment follows the Ph.D., (7) what undergraduate training is accepted, and (8) whether a master's degree is required prior to entrance to the doctoral program. All these factors are interrelated.

Institutional and field-specific factors that cause lengthy time to the doctorate are partly interrelated. Yet there are factors that are determined solely within the institution and department. These are: (1) degree requirements, (2) teaching requirements and the system of evaluating graduate student progress, (3) faculty advising and departmental guidance, (4) financial burden, financial support for students, and debt accumulation, (5) the campus facilities, and (6) the professional job opportunities and placement support offered by the department and campus.

Figure 1 shows in summary form how each of these factors can affect both high and low time to degree and attrition. The following discussion focuses on selected factors and highlights those with particular impact on women and minorities.

1. Research Training

In the sciences, research training is primarily of the apprenticeship type. Graduate students acquire skills by working in a laboratory and generally work as members of research groups. The laboratory situation frequently provides them with an intense social structure in which to undertake dissertation research. Under this structure, students must attend weekly laboratory meetings, where they periodically present results of their recent work.

In contrast, the research training in the arts, humanities, and social sciences is individualistic. Graduate students are most likely to conduct the research

[8]Ellen Benkin, "Where Have All the Doctoral Students Gone: A Study of Doctoral Student Attrition at UCLA," Doctoral Dissertation, University of California, Los Angeles, 1984.

alone, in the library, or off-campus. Aside from discussions in seminars on the research process, humanities students are unlikely to work with groups of students and faculty. They obtain training from the written and verbal guidance of individual faculty members.[9] These modes of conducting and teaching research are traditional to particular fields, because they have proven to be educationally suitable over the years, and because they satisfy each discipline's understanding of rigor and method.

2. Research Funding

Since World War II, science and engineering fields have received vastly more federal and private funding than the humanities and social sciences. In the 1980s, funding both from private foundations and public agencies for the humanities and many social science areas was particularly scarce. The presence or absence of money for research results in different experiences and problems for students in the various disciplines.

For the most part, students in the natural sciences are regularly employed as research assistants. Their dissertation work is normally identical with their paid work as research assistants. Thus, their dissertation research is part of a larger research project, funded, organized, and supervised by their major advisor. In addition, students supported by fellowships and training grants have similar opportunities to do their research.

Arts and humanities students have many fewer opportunities to work as research assistants. The primary form of institutional support is teaching assistantships. In 1980-1988, for example, only 2% of all UC arts and humanities degree recipients reported that a research assistantship (RA-ship) was the primary financial support during their doctoral study. In contrast, nearly 50% of all degree recipients in engineering and the physical sciences reported that their primary source of support was a research assistantship (**Table 13**).

Social sciences and professional field students have some opportunity to work as research assistants. When they do so, this paid work rarely overlaps with their dissertation work. In 1980-1988, only 11% of all social sciences and 8% of all professional school degree recipients reported that their primary support was a research assistantship (Table 13). In 1980-1988, students whose primary financial support came from research assistantships took an average of 7.0 years to complete their degrees, while students whose primary support came from teaching took 8.3 years to complete their degrees (**Table 14**).

[9]See Patricia Gumport, "Basic Research and the Nature of Graduate Education: Preliminary Results from a Micro Study," presented at the meeting of the American Academy of Sciences at San Francisco, January 14-19, 1989.

The presence of research money not only contributes to financial security during graduate studies, but also to more frequent interactions between faculty advisers and graduate students. This situation creates the potential for a desirable mentor relationship, which provides the student a role model, academic advice, and assistance in gaining access to the profession.

3. Post-Doctoral Study

An important factor explaining the differences between the sciences and engineering versus the social sciences and humanities is the role and function of postdoctoral studies. It has become a tradition for life sciences, physical sciences, and for some engineering doctorates who intend to pursue an academic career, to undertake at least two years of postdoctoral study. This is not the case in the arts, humanities and professional schools, and only rarely in the social sciences. (The maturation process is part of the degree expectations of the humanities, some social sciences, and professional schools.)[10] In the sciences, however, new Ph.D.'s are expected to mature in post-doctoral positions. For example, a study on the placement of doctoral students at Berkeley (1980-1987) found that of all the students who pursued post-doctoral study after completing the Ph.D., 48% came from the life sciences, 26% from the physical sciences, 8% from engineering, 13% from the social sciences, only 4% from humanities, and 0.5% from the professional schools.[11] Information on student placement for UC as a whole, based on a newly established reporting system, will be forthcoming from the Office of the President.

The question, then, from the viewpoint of time to degree and subsequent employment, is not how long it takes to train doctoral students, but rather, how long it takes to train a professional in a field. Viewing the time aspect from such an angle, one concludes that the time difference between the sciences and humanities disappears. To train a full-fledged accomplished professional in both fields takes, then, nine years on the average.

4. Master's Requirements

The requirement of a master's degree prior to the doctoral degree has differing effects on time to degree, depending on the discipline, as discussed below. Nearly all professional fields require a master's degree before acceptance to the doctoral program. This step, where required, adds an average of 1.6 years to the doctoral degree time in professions. Furthermore, nearly 70% of professional school doctoral recipients who earned a master's degree earned

[10]Theodore Ziolkowski, "The Ph.D. Squid," The Academic Scholar." Spring, 1990

[11]Ann MacLachlan, UCB Placement Project 1990, Table 10, "Post Doctoral Appointments by Year and Field," 1980-1987

the degree at an institution other than the one where they received the doctorate. This increases the time on average of another 2.2 years (**Tables 8 and 9**).

Most humanities programs also require a master's degree, correlating with an additional 1.5 years for those who acquire the master's at the same institution, and 4 years for those who acquired the master's elsewhere. In contrast, only half of all students in the life sciences and physical sciences acquired a master's (when students took a master's degree at the doctoral institution, this step added 1.7 years in the life sciences and one year in the physical sciences; and for those who received the master's elsewhere it added 3.5 years in the life sciences, and 3.2 years in the physical sciences).

The majority of engineering programs require a master's degree before entrance to the Ph.D. program. However, the added time is less than in the professional fields and social sciences (0.7 years added with an M.S. from same institution, and an additional 2.6 years with an M.S. from elsewhere). Since engineering doctoral training is tightly structured, students move along relatively quickly.

When these factors are added together, it is not surprising that the average time in the humanities and professional fields is longer than in the life sciences, physical sciences, and engineering. Key differences include the lack of dissertation research funding, more loosely structured research training, and the nature of independent dissertation work.

Women and non-Asian minority students are particularly affected by these issues, since they are clustered in the arts, humanities, and professional fields (**Graphs 2 and 3**). Between 1980 and 1988, 36% of all women and 31% of all non-Asian minorities received degrees in arts, humanities, and professional schools. The case is similar in the social sciences, where 22% of women and 23% of non-Asian minorities received doctoral degrees.

When students in the natural sciences (particularly in physics, engineering, and molecular biology) take a long time to complete their degrees, it is often because of a failed experiment. When a student must rebuild the entire set-up, it can add between six months and a year to the time to degree. Faculty have indicated that, nowadays, there are fewer laboratory technicians available than when they studied and the burden on students to rebuild everything themselves is greater.

Altogether, various factors contributed to a longer time in the humanities, social sciences, and professional schools, as compared to the sciences and engineering fields. Among the factors described above, students and faculty in the former fields cited loosely structured research training and lack of research money as key reasons for long time to degree. While a general change of research requirements and practice can only occur through the profession on a

national level, the funding for research, especially that for graduate student research assistantships, could be improved by the state, by funding agencies, and by the university itself.

5. Degree Requirements

Most faculty members interviewed argued that the increase in time to degree is due, at least in part, to an increase in the requirements for the doctoral degree. Recent publications on time to degree have also suggested this explanation.[12] According to this argument, the expanding knowledge base demands more learning time and higher quality work is expected of doctoral students than in the past.

To judge whether a "knowledge explosion" has occurred in each field, and whether students must learn more information, theory, and methodology, UC would need objective measures of the expansion of both knowledge and curricula in each field--information that is not currently available, and perhaps could never be assembled in useful form. Even with such measures, however, UC would still be limited in determining whether the increase in time results from increased requirements, given the fact that students progress at different rates.[13] Considering these methodological difficulties, this study approached the issue from two angles. First, this study examined whether degree requirements changed over time, and whether these changes would have an impact on lengthening time. Second, this study investigated degree requirements for 1989-90 in the same disciplines at three different campuses to determine how much the degree requirements vary within the same field. The results are summarized in **Figures 2 and 3.**

For the examination of requirement changes over time, this study inspected the stated requirements for the Ph.D. degree (reported in graduate program handbooks, bulletins, and so forth.) of five departments at Berkeley: Biochemistry, Electrical Engineering and Computer Science (EECS), English, History, and Sociology.[14] A ten-year interval was selected to measure changes in program requirements, comparing requirements for students entering in 1978 to those entering in 1988. This time interval was based on the availability of adequate documentation and on requirements from the departments, and it captured changes which actually predated the year 1988.

[12]Tuckman, 1990; Ziolkowski, 1990.

[13]Tuckman, et al., 1990, p. 97.

[14]Carol Lynn Stewart, from the Graduate Division at Berkeley, undertook this survey.

The study found that nearly all departments reduced course requirements or foreign language (English, History, Biochemistry), created more flexibility (EECS), implemented means to help students stay on track, such as annual reviews after advancement (Biochemistry), or required a dissertation prospectus of specified length by a certain time (History, English). The exception was Sociology, where students had to take a more labor-intensive methods course. An added requirement in one department (EECS) was that students serve as teaching assistants (TAs); the added teaching requirement should be seen as a positive addition to the student's program, since teaching skills are essential to a faculty position. Altogether, this study found that a time decrease in these departments coincided with flexibility or tightening of structure, and a time increase with an additional acquisition of new research methods.

It should be repeated that these results do not give an exact measure of time increases due to changed degree requirements. Furthermore, the requirements examined here represent formal requirements, and do not present a total picture of graduate study. Future research should explore the informal or "understood" requirements that do not appear in print. More detailed research which covers a larger sample over more years is required. This sample survey, however, illustrates that many departments are reconsidering their requirements in an awareness of the problem of lengthened time to degree.

For the second step, the study compared the official degree requirements, taken from the general campus catalog, for Biochemistry, Electrical Engineering, English, History, and Sociology at Irvine, Los Angeles, and Santa Barbara. Since each program is unique and diversity among the campuses is a goal at the University of California, we expected some variations and found them. See **Figure 2** for summary results.

6. Teaching Requirements

In recent years, a popular assumption has emerged that graduate students teach "more students for more hours for more years" than in the past,[15] and that this expanded work load contributes to lengthening time to degree. Though true in some cases, this assumption cannot be made about all departments. The complicated question of teaching and time to degree involves in-depth investigation.

Teaching serves two functions in a doctoral program. First, by working as teaching assistants, students learn the skills necessary in competing for and acquiring a faculty position. Second, a teaching assistantship (TA-ship) provides crucial financial support for many students. As mentioned earlier,

[15]John D'Arms, "Universities Must Lead the Effort to Avert Impending National Shortages of Ph.D.'s, The Chronicle of Higher Education. January 27, 1990.

students in the arts, humanities, and some social science departments especially depend upon these positions. Life science students studying organisms also rely on teaching assistantships for support. In a discussion of time to degree and teaching, the question that should be asked is not whether teaching requirements should exist, but how much teaching is necessary for adequate professional training.

A period of at least two years of teaching experience, along with training workshops and efficient supervision, forms a solid basis for future teaching positions, according to TA supervisors. All nine campuses now offer formal TA training and supervision.[16] Since many students depend on teaching as major financial support, they will often teach beyond the two years to the permitted four year limit and sometimes two years beyond with special permission.

A Berkeley study examined the relationship between time to degree and financial support in five humanities and social science departments. The study showed that students who taught three or more years took one year longer than students who taught less than three years (**Table 15**). The NRC data (1980-1988) on the relationship between source of primary support and time to degree indicate that students who supported themselves primarily on teaching took 1.3 years longer than those who depended on research assistantships. These same students took 0.4 years longer than those who were supported by fellowships (**Table 14**).

7. Faculty Advising and Departmental Guidance

Most of the interviewed students discussed relations with their principal dissertation adviser. They either praised their major adviser as being a wonderful mentor, or expressed the need for such an adviser. What do students expect from an adviser who is also their mentor?

From sources including student interviews, this study arrived at the following characteristics which students expect in an adviser. An ideal adviser is also a mentor who helps students to set goals and standards, who develops students' skills, who protects students from failures, and who advises them on appropriate and feasible dissertation topics. The adviser also facilitates the students' entry into academic and professional circles.[17] The relationship between student and adviser is based on mutual acceptance and respect.

[16]These recent developments are partly the result of a Universitywide study on TA training (1987-88).

[17]Refugio I. Rochin, "Mentor/Mentoring: What it is and What it Means to Me," Paper presented at the UC President's Post-Doctoral Fellowship Orientation, Berkeley, October, 1989.

8. Financial Burdens and Financial Support

According to students, faculty, and graduate deans, one of the key factors in longer times to degree is insufficient financial support for doctoral students. Minority students and students in the arts and humanities, education, and social sciences are particularly vocal about the rising fees, soaring housing costs, and the expenses of health insurance, car insurance, and raising a family. They are deeply affected by the increasing discrepancy between expenses and financial support. These students assert that the uncertainty of future financial support, particularly after the fourth year in graduate school,[18] had an impact on their academic performance.

In response to these comments, this study examined the relationship between financial support and student expenses (**Table 16**). For the years 1980 through 1988, the Office of Student Financial Support in the Office of the President has compared the expense budgets of graduate students to the financial support they received. The expense budgets are based on campus estimates of living expenses plus both nonresident tuition (prorated to reflect the fact that only a portion of the students pay this charge) and fees. The academic year (nine-month) expense budget for a student was $12,007 in 1988, $3,098 more than in 1980 (in 1988 constant dollars). The financial support that a student in 1988 could expect on the average was $7,671 as compared to $6,537 in 1980. This means that between 1980 and 1988, average expenses increased by 35%, while average financial support increased only by 17%. Thus, in 1980 a student could expect 73% of estimated expenses to be covered for nine months by some kind of financial support (fellowships, teaching or research assistantships, loans, etc.). In 1988, a student could only expect 64% of expenses to be covered.

One should probably not assume from these proportions that students must provide only 36% of their own funds for financial support; there are additional costs which these calculations do not include, such as the additional costs for dependents incurred by students with families. Furthermore, financial support such as teaching assistantships, readerships, and research assistantships may not be equally available from department to department. Fellowships are strictly merit-based and small in number compared to the total student population. Graduate students must also cover expenses during semester breaks, which are often prime research and writing periods because they pose fewer distractions or competing demands on students' time.

[18]For this reason, The Regents Graduate Opportunity Program, The Academic Career Development Program for Minorities and Women, and individual campus programs provide minority students with multi-year support packages. See Part II.

UC's analysis has shown that time to degree is related to amount of support and type of support. Results from the 1980-88 NRC data for all nine campuses, covering all Ph.D.'s regardless of where the master's degrees were earned, support these conclusions. Students whose primary support came from their own funds[19] took the longest to complete their degrees (11 years), followed by students whose primary support came from loans (9.4 years). Students who took the shortest time (7.0 years) were those who depended primarily upon research assistantships, and those who were supported by fellowships (7.9 years). Students who lived primarily on teaching assistantships took 8.3 years. These times applied to both men and women (**Table 14**). Non-Asian minorities who were funded primarily by fellowships, research assistantships, or teaching assistantships had shorter times than those whose primary support came from loans and own earnings. In order to maximize the effect of a fellowship, UC programs for underrepresented minorities and women, such as UC's "Academic Career Development Program for Minorities and Women" is linking the fellowship with faculty mentoring to ensure that minority students benefit from the same attention research assistants receive (see Part II).

Under the category of "own funding," the majority of doctoral recipients reported their own earnings as the source of primary support. For example in 1980-1988, 16% of the men and 21% of the women reported that they were funded by their own earnings. In addition, 5% of men and 13% of women were supported by their spouses' earnings. Only 2% of men and 2% of women reported family contributions as primary support (**Table 13**). The most common source of support for non-Asian minorities was their own income (36%). Similar findings were reported by Benkin (1984) at UCLA and by Tuckman (1990).

A larger proportion of women than men (38% versus 27%) reported that their primary support came from their own funds. For women, this was true in all fields, except in the physical sciences. Concerning those with primary support from fellowships, proportionally fewer women in the professional schools and arts and humanities reported that their primary support came from fellowships (**Table 13**). Finding reasons for these differences will require further research.

In all fields, a larger proportion of minorities than whites reported that they were funded primarily by fellowships. The only exception was Asian American students in engineering and computer sciences. Fewer Asian Americans received fellowships, but more of them were primarily funded by research assistantships. Women were supported less often than men by research assistantships, in all fields except the physical sciences. Non-Asian minority

[19]Own earnings, spouse's earnings, and family contributions fall under own funds.

students held more multi-year fellowships than whites, but were supported less often by research assistantships in all areas except the life sciences.

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In summary, the average graduate student expenses during the last ten years increased at a higher rate than the financial support awarded. Students whose major financial support came from their own earnings took the longest time to complete their degrees, followed by students supported by teaching. The most advantageous combination in terms of time to degree proved to be a research assistantship, followed by multi-year fellowships.

Another aspect of students' financial burden was examined by analyzing the amount of debts students accumulated during their undergraduate and graduate studies. In 1988,[20] more than half of all doctoral degree recipients (59%) accumulated debts during their years as students; 12% of these had debts over $20,000, 23% between $10,000 and $20,000, and the remaining below $10,000 **(Table 17).**

The largest proportion of degree recipients with debts was in the social sciences (67%). Next followed those in the life sciences (65%), the professional fields (58%), and the arts and humanities (56%). Interestingly, the amount of debt that degree recipients accumulated did not vary by field. About the same proportion of women and men accumulated some amount of debt (59% of men and 60% of women). However, women generally had smaller accumulated debt than men.

A larger proportion of non-Asian minority degree recipients (77%) accumulated debts, compared to whites (58%) or Asian Americans (54%). Nearly 80% of African American degree recipients reported having accumulated debt, 26% reported debts over $20,000, compared with 11% of whites and 12% of Asian Americans reporting this amount of debt. Few findings illustrate more clearly how essential financial support is for African Americans, Chicanos/Latinos, and American Indians for successful completion of their studies. The small number of non-Asian minority doctorates may be due, among other reasons, to financial factors. For example, students often would prefer not to be supported solely by loans, and minority students who have debts from their undergraduate degree programs may, as a result, refrain from pursuing doctoral degrees. (See especially Part II for a discussion of the debt load of minority undergraduate students.)

[20]This question was only recently included into the NRC questionnaire. Therefore, only 1988 data are available.

9. Campus Facilities

To address further the question of the rising graduate student expenses, this study collected information from campus housing offices on the cost of on- and off-campus housing and campus child care facilities.

In 1989-90, data for six campuses indicate that single graduate student on-campus housing ranged between $245 a month in San Francisco to $435 a month in San Diego (**Table 18**). Price of housing varied from campus to campus. According to the campus housing offices, Davis, Irvine, and San Francisco have the least expensive housing. Berkeley offers no targeted student housing for single graduate students. Data for Los Angeles and Riverside are not included in this study. The range in cost of family student housing stretches from $290 a month to $570 a month. According to these figures, half of the research assistant or teaching assistant salary could be spent on housing alone.

This study also examined campus child care facilities. In 1988, 41% of doctoral degree recipients had one or more dependents, many of them children (**Table 5**). In 1987-88, all campuses had child care, but with the exception of Berkeley and Santa Cruz, the facilities served faculty, staff, undergraduates, and the community as well as graduate students. In 1987-88 in Los Angeles, only 2.5% of all graduate student parents found space in the campus child care facilities for their children (**Table 19**). These students had to add between $350 to $495 a month onto their cost of living expenses. It is worth noting that in 1988, proportionally more minority degree recipients than whites reported responsibility for dependents.

10. The Professional Job Market

When faculty were asked about reasons for the lengthening of time to degree, many named the academic job situation as a major factor. They argued that the prospect of a "good job" is a strong incentive for many students to complete the degree in a timely fashion. Interviewed students confirmed this statement on occasion. Conversely, the lack of job prospects has, in the past, often made it seem logical for students to spend more time polishing their dissertations in order to be more competitive. This situation will change as the job market continues to expand over the next decade. An objective examination of this argument was, however, beyond the scope of this study.

VI. Completion rates (attrition)--UC Berkeley study

It is often believed that students who draw out their time to degree may not complete their dissertation after all and may become "drop-outs." How many students complete their doctoral programs? If they leave before receiving the doctorate, when do they leave?

These questions cannot yet be answered for the entire University of California. The Systemwide Graduate Longitudinal Database System, which tracks students over time, does not have enough years of data to analyze completion rates. At this point, only data from a recent Berkeley study of the 1975, 1976, and 1977 cohorts, and the results of a doctoral dissertation study of the 1969, 1970, 1971 cohorts at UCLA are available. Both studies showed similar results: over 50% of students who began studying for a doctorate reached the degree goal. However, it is not correct to conclude that the remaining students left the university without a degree. At Berkeley, 25% earned a master's degree before leaving, and thus about 75% of all students who started a doctoral program in 1975, 1976, and 1977 received a graduate degree of some kind (**Table 20**).

The majority of doctoral students (31%) who do not complete a Ph.D. leave during their first three years of graduate study, before advancement to candidacy, not afterwards, as is commonly believed. Another 11% leave after advancement to candidacy, and another 6% were pending at the time these data were analyzed (**Table 21**). Benkin's study of UCLA doctoral students found similar results. Although women have a 10% lower overall completion rate than men, in natural resources and professional fields they have a higher completion rate than men.

Doctoral completion rates at Berkeley also vary substantially among major fields of study (**Graph 6**). Low completion rates correlate with long time to degree. The biological (68%) and physical sciences (67%) have the highest completion rates and also short time to doctoral degree; languages and literature (30%) and arts (42%) have low completion rates and long time to degree. Ethnic minority students are concentrated in the professional fields and social sciences--fields that have lengthy time to degree and low completion rates--thus, as a group, minority students have lower completion rates than whites, who studied in a wider variety of fields.

A higher percentage of minority students (36%) than whites (29%) leave during the first three years. Slightly more women (14%) than men (10%) leave after advancement to candidacy, and more are still pending after twelve years (8% of women, versus 5% of men). The variation by field is the greatest after advancement to candidacy. Between 14% and 23% of students in languages and literature, the arts, and the professional fields leave after the third year, as compared to the biological sciences, engineering, and the physical sciences, where only 4% to 8% leave after advancement to candidacy (**Table 22**).

Informal meetings with deans at major research universities confirm that the situation at Berkeley resembles that at other top ranking research universities.

* * * * * *

It must be understood that students leave for many reasons, some personal and some institutional. Frequently, students who left graduate school after one or two years reported that their expectations were not met regarding the general field of study, graduate student life, or the focus of the program. Particularly students in the professional fields and engineering who already have a master's degree rethink their career goals and often choose to leave after the first year. These students often have an alternative in well-paying jobs.

The literature (Berelson 1961, Tucker 1964) clarifies that there will always be students who leave before advancement to candidacy, because of unmet expectations, regardless of guaranteed financial support. In the cohort that Berkeley has studied, it is estimated that about 10% to 15% will inevitably leave. The Berkeley findings, however, bring up further concerns. Why does a higher proportion of minority students than white students leave during the first three years? Why do more women than men leave after advancement to candidacy? More research, with a larger sample than that of the Berkeley study, will be necessary to verify these trends and find explanations. The Systemwide Graduate Longitudinal Database System will eventually allow UC to understand the basic attrition patterns at the University of California, and the discussions underway at many UC campuses will supplement this quantitative data. Thus, the description in this report should be regarded as the beginning of the University's consideration of this issue. Increasing changes and systemwide attention devoted to graduate retention issues is likely to result in new intervention strategies and other policy changes.

Part II

UC Strategies for Recruitment and Reduction of Time to Complete Degrees for Minority and Women Doctoral Students

PART II

UC Strategies for Recruitment and Reduction of Time to Complete Degrees for Minority and Women Doctoral Students

I. Overview

Minorities and women continue to be severely underrepresented[1] in doctoral programs, particularly in certain disciplines, both nationwide and at the University of California. According to nationwide 1988 data from the National Research Council, African Americans earned 3.7%, and Chicanos 2.6%, of Ph.D. degrees awarded to U.S. citizens. Although the number of women receiving doctorates increased over the last decade to 35% of total Ph.D.s in 1988, fewer than 7% of engineering doctorates and 16% of physical science doctorates went to women. At the University of California in 1989-90, African Americans received 1.8% of all doctoral degrees conferred to domestic students, and Chicano/Latinos received 3.4%. Women received 37.6% of Ph.D. degrees, but fewer than 12% of degrees in engineering/computer science and 21% in the physical sciences. In 1989-90, Asian Americans received approximately 8% of all UC doctorates awarded to domestic students, but received only 3.1% of all doctorates in arts and humanities.

This situation exists amidst a growing need for new doctorates and a rapidly growing minority population in California and across the country. In replacing retiring faculty and accommodating greater numbers of students, UC and CSU faculties need to reflect the growing diversity of the state's population both to serve as role models for students and to foster new directions in their disciplines that deal explicitly with the points of view relevant to their cultures and gender. Projections of demand and UC enrollment growth are discussed in the University's Fall 1990 graduate enrollment planning document.

Senate Concurrent Resolution 66 (Hart, 1989) underscores the opportunity presented by the high number of faculty retirements in the next two decades for the University of California to prepare and hire more underrepresented minority and women doctoral degree recipients. The Resolution (see the Executive Summary) emphasizes the need to increase the numbers of minority

[1]In this report, the term "underrepresented minorities" at the undergraduate level refers to American Indians, African Americans and Chicanos/Latinos. At the graduate level, underrepresented minority students include these three groups plus Filipinos, Pacific Islanders, and Asians in the humanities and social sciences. At the graduate level, underrepresented women include those in the broad fields encompassing physical sciences, mathematics, engineering and computer sciences.

and women students in and completing graduate programs at the University of California, and asks the University to report on a number of factors--particularly issues of recruitment, retention and completion of doctoral degrees, and placement--that influence the ability of underrepresented minorities and women to enter and complete doctoral degrees and go on to academic careers. This part of the University of California's response to that Resolution examines major factors affecting the recruitment and retention into graduate programs and completion of doctoral degrees which affect women and minorities in pursuing graduate education at UC. This part also describes the variety of programs the University of California has developed to increase the flow of minorities and women into doctoral programs and to assist these students toward the completion of doctoral degrees in a timely fashion. The paper discusses as well the status of the University's research on employment of minority and women doctoral recipients.

The concerns expressed in SCR 66 are reflected in those which led President Gardner to convene an All-University Faculty Conference on Graduate Student and Faculty Affirmative Action hosted by the San Diego Campus in February 1990. Approximately 170 UC faculty members, senior administrators, and Regents who attended considered ways in which UC faculty could help improve the diversity within the University. Attendees suggested a concerted approach to achieving greater diversity among the graduate student body and the faculty. The report on this conference, which includes recommendations, may be found in Appendix G.

II. Recruitment of Underrepresented Minorities and Women into Graduate Study: Factors and Strategies

In order to increase the diversity of the graduate student body, it is clear that efforts to recruit minorities must be a high priority, since comparatively few apply to graduate school at the University of California. For example, in 1987, only 3.2% of applicants were African-Americans, 4.9% Chicanos and Latinos, and 10.2% were Asians, compared with the 80% of the applicants who were white.[2] Furthermore, although on average three or four out of every ten applicants from each ethnic group are admitted, only about half of those admitted for each ethnic group actually enroll. While these data indicate that underrepresented minorities are admitted to and enroll in graduate school in roughly the same proportions as white students, their numbers are strikingly small. It should be noted that these figures also represent only new enrollments to graduate school; not all of these students are in doctoral programs. In this section, we will review some of the major factors affecting

[2]These figures exclude applicants for professional fields of law and health sciences.

the size of the enrollments of underrepresented minorities and women in doctoral programs and some of the strategies UC has developed to increase these numbers.

The number of minorities and women entering graduate study at the University, as well as at other doctoral granting institutions across the country, depends in part on the size of the pool of qualified and available candidates. It also depends in part on the number of spaces available in particular graduate programs and criteria developed by faculty on whom to admit. These individual and institutional factors are discussed below.

Individual Factors

One factor affecting the size of the pool of minority and women students for graduate school at UC is interest in doctoral degrees and academic careers. National and UC data indicate that many minority students have limited interest in pursuing graduate degrees. There are a host of reasons--some personal, some cultural, some economic, some having to do with prior academic preparation--which account for decisions not to pursue graduate study. In many cases, minority undergraduates are the first in their families to have attended college. A 1988-89 study conducted by the Office of the President indicates that 77% of white undergraduates had at least one parent holding a college degree, and that 44% had a parent with some type of post-graduate degree. In striking contrast, 51% of non-Asian minority students come from families in which neither parent obtained a college degree.[3] These students (and their families) may look upon the baccalaureate degree as the ultimate educational goal and may not consider advanced degrees to be within the realm of possibility.[4]

Financial constraints are frequently a major deterrent to pursuing an advanced degree. Parental income of minority students at UC is substantially lower than that of white students: from 26% to 33% of minority and 17% of Asian undergraduates report 1988 parental income of less than $18,000. Of undergraduates deciding not to pursue advanced degrees, 44% of underrepresented minorities and 67% of Asians cite financial constraints as the primary reason. Although parental income of less than $18,000 is reported by only 8% of white undergraduates, 34% of white students also cite financial constraints. Women, too, may be reluctant to embark on full-time graduate study and academic careers, if they are responsible for the care of children,

[3]1988-89 Student Expenses and Resources Survey (SEARS), University of California, Office of the President.

[4]Enhancing the Minority Presence in Graduate Education. Council of Graduate Schools, 1988, p. 12.

unless they have low-cost child-care available. It is clear that many individuals, but disproportionately minorities and women, feel that doctoral studies are beyond their means. The debt students face from their undergraduate years is a significant factor in these considerations (see section V of Part I on factors contributing to lengthened time to degree).

When minority students also see their education as a vehicle to rise above the poverty they have experienced either personally or in their communities, they may choose fields of study that promise high-profile, high-paying jobs or ones which enable them to do something for their communities (e.g. medicine, dentistry, law, and engineering) within a clearly specified length of time.[5] Even though these careers entail advanced education, they promise high paying careers which would soon defray loans incurred to complete both baccalaureate and professional degrees. The result is that many of these students may be undertaking advanced study but not be interested in doctoral programs and not be oriented toward the goal of academic careers.

Academic preparation is another significant factor affecting minority and women students' decisions to pursue doctoral studies. Low undergraduate grade point averages in combination with low Graduate Record Examination (GRE) scores usually preclude graduate study in any discipline. At UC, the average GPA for minority students at graduation tends to be slightly lower than for white students.[6] Minorities also have been found to score lower than whites on the verbal portion of the GRE and, with the exception of Asians, this is true as well for the quantitative and analytic portions of the GRE. Women score lower on all three portions, and significantly lower on the quantitative section, than do men.[7] For those juniors and seniors in 1988-89 who decided not to pursue advanced degrees immediately after graduation, a low undergraduate grade-point average (GPA) is cited by 32% of minority students, compared to reports by 23% of white students, as the principal reason for their decision.[8]

[5]See Joyce Justus, Sandria Freitag, and Leann Parker, The University of California in the 21st Century: Successful Approaches to Faculty Diversity. University of California, Office of the President, Spring 1987, p. 22.

[6]Student Academic Services Report, University of California, Office of the President, 1990.

[7]Standardized Tests Used for Higher Education Admission and Placement in California During 1989. California Postsecondary Education Commission, April, 1990.

[8]SEARS, 1988-89.

While precollege training can influence decisions to pursue a doctorate, it can also affect the choice of major in college, particularly in the mathematics and science disciplines. Whereas some women and minority students may be drawn to fields which they perceive to lead to high-paying jobs, other minority and women students avoid fields for which they have, or perceive they have, insufficient academic preparation. This is particularly true with respect to math and the sciences. Minorities and women are less likely to prepare themselves for these fields than white males: a 1990 national study on the mathematical sciences found that "males have consistently scored higher than females by about 50 points on mathematics section of the SAT for the last two decades; mathematics scores for blacks and Hispanics showed steady improvement during this period but were below the national average."[9] These patterns may explain why many women and minorities at UC and across the nation avoid undergraduate majors requiring calculus and science courses, as well careers in math and science disciplines.[10] At UC alone, compared to the approximately 34% of white UC undergraduates who major in either engineering, mathematics, or natural science fields, 24% of non-Asian minority students did so in 1989-90.[11]

Institutional Factors and Strategies

Efforts to recruit minorities and women into graduate programs at the University are affected by a number of factors. One is the number of spaces available for graduate students in each department every year. Because of limitations on facilities (e.g. laboratory capacity), faculty size, and state support for graduate enrollments, departments must limit the number of new graduate students they can admit.

[9]A Challenge of Numbers: People in the Mathematical Sciences. National Academy Press, 1990, p. 23.

[10]See A Challenge of Numbers: People in the Mathematical Sciences. National Academy Press, 1990, pp. 24-33. A 1983 University of Michigan study found that "the college science classroom is perceived by most women ... as an 'unfriendly' place to be." The study speculated that this unease may contribute to a higher attrition rate for women than men considering a science major, and that "what may act as a spur to individual achievement for men is a significant deterrent for women." See Sheila Tobias, "They're Not Dumb. They're Different," in Change, American Association for Higher Education, July/August, 1990, p. 24.

[11]Student Academic Services Report, University of California, Office of the President, 1990.

A second factor has to do with academic preparation of prospective candidates. Direct faculty mentorship of minority and women undergraduates serves not only to provide a hands-on opportunity for these students to experience scholarly inquiry and the graduate school environment, but it enables faculty to work directly with outstanding minority and women students. UC faculty members have consistently expressed the strongest support for graduate preparation and recruitment programs which offer the opportunity both to observe the quality of the individual students and to communicate with faculty and administrators on the campuses from which these students come.

To address individual and institutional factors that have limited the pool of qualified minority and women students, UC has determined that its challenge is fourfold: UC must (1) identify and interest students in graduate study and academic careers; (2) encourage minority and women students to consider careers in fields in which they have traditionally been underrepresented; (3) provide specific academic preparation programs to ensure that these students are competitive for the available openings in graduate programs each year; and (4) provide sufficient financial support and faculty mentorship and to promote a campus environment that supports diversity.

Recognizing these challenges, the University has developed, over the past few years, a progression of programs to improve the preparation of minorities and women and encourage them to consider graduate studies and academic careers. These programs begin with secondary school students and continue into pre-baccalaureate years. Because as UC recruits graduate students on a national as well as a statewide basis, many of the pre-baccalaureate preparation and recruitment programs have been designed to attract minority and women students from colleges and universities across the nation and from its own campuses, the California Community Colleges, and The California State University (which annually graduates a large number of women and minority students).

A critical element in UC's graduate preparation and recruitment programs involves increasing the awareness of many minorities that graduate school can lead them into viable and enjoyable careers they may never have considered otherwise. These programs present students with information about graduate study and academic careers, provide first-hand experience in research, and improve particular skills that will allow a successful academic experience in graduate study. Moreover, there has been a deliberate effort to include a faculty mentorship component to bring talented minority and women undergraduates to the attention of UC faculty. A description of the major programs that are sponsored systemwide is provided below.

EARLY OUTREACH EFFORTS: Among the many programs that comprise the University's early outreach efforts into the high schools and community colleges are several that focus specifically on alerting students to academic careers, particularly in the sciences. Working with over 55,000 students between the 7th

and 12th grades the Early Academic Outreach Program motivates students to enroll in postsecondary education and academically prepares them to do so. Students participate in career exploration workshops which outline the educational requirements of various careers, many of which include post-baccalaureate study. The Mathematics, Engineering, Science Achievement Program (MESA), which works with over 6,000 students between the 7th and 12th grade, links participants with professionals in the math, engineering and science fields, who serve as role models and promote educational attainment beyond the bachelor's degree.

Some campuses have special efforts as well. For example, UC San Diego administers a High School Summer Enrichment Program in which fifty minority and disadvantaged high school students participate in science fair projects. The program involves mentorship by UCSD faculty and staff as well as tutoring in the sciences, mathematics, and computer science. Each year UC Riverside's Minority High School Research Apprenticeship Program brings minority high school students to spend the summer with Riverside faculty working on research projects in biology. Through the University Partnership Project, UC Davis provides advising services and summer laboratory placements for minority students from neighboring community colleges.

PREGRADUATE PROGRAMS: Recognizing that many doctoral programs, especially those in science, require considerable prerequisite coursework, the University seeks to provide the proper curriculum planning guidance, along with direct research experience, in its Summer Research Internship Program. Sponsored by the Office of the President and administered by the Graduate Deans with considerable funding assistance from various federal grants, this program is designed to introduce promising juniors from UC, CSU, and other universities throughout the country, to first-hand research experience. The program places students one-on-one with faculty mentors for 8-10 weeks.

In 1988, 134 students participated in Summer Research Programs. Supplemented with grants from the Department of Education, the National Science Foundation, and other sources, the Summer pre-graduate internship programs were able to support 263 students in 1989. Since a systematic tracking of the alumni of the summer programs was begun only last year, it is too early to determine how many of these students have gone to graduate school. However, several campuses have reported a gratifying number of cases of students who came into the program either without aspirations for graduate study or with an intention to attend medical school, who have now applied to doctoral programs at the University of California.

In many cases, students come into these programs with no research experience. Anecdotal evidence suggests that students who vaguely had a goal of becoming a lawyer or a doctor often realize, at the end of the 10-week period, that an array of previously unfamiliar career choices that depend on research is available to them. In addition to motivating these students, these programs

also aim to empower students with skills at an early enough point to compete successfully for entrance into UC's doctoral programs. A very important component of these programs is a Graduate Record Exam (GRE) Preparation workshop in which students are informed of the importance of this exam and given intensive instruction in how to prepare for it.

The Office of the President also sponsors two year-round programs designed to increase the flow of University of California minority and women undergraduates into graduate studies by placing faculty in a mentoring relationship with promising juniors and seniors. In the undergraduate Pregraduate Mentorship Program and the Undergraduate Minority Scholars Program, participating faculty on each campus work with individual students to strengthen their academic skills, to involve students in their research projects, and to arrange for supplemental academic assistance through Student Affirmative Action academic support services on campus. Both programs facilitate the identification of promising minority students, and establish faculty mentor networks through which students receive academic advice and research experience. The programs encourage faculty mentors to provide students with an understanding of the opportunities that graduate school and an academic career can offer. Students in the programs are expected to attend seminars, participate in workshops, or pursue other activities which provide information on and preparation for graduate studies. The Undergraduate Minority Scholars Program, modeled on Berkeley's successful Professional Development Program (see below), was initiated in 1988-89 with funding of $300,000. Funding for the Pregraduate Mentorship Program, which was initiated in 1989-90, is $1 million. Attached in Appendix F are examples of each campus' activities for these two programs.

Individual UC campuses have also mounted their own pre-baccalaureate preparation and mentorship programs, some sponsored by private funds. For example, four UC campuses--Davis, Irvine, San Diego and Santa Cruz --have received grants of more than $1 million from the Howard Hughes Medical Institute to promote the development of minority undergraduates in the biological sciences and to prepare these students for science careers. Each of these programs places students with faculty mentors and provides academic advising, hands-on research opportunities and information about graduate study and academic careers.

UC Berkeley's Professional Development Program also sponsors a summer program for minority juniors and seniors interested in graduate study in mathematics. The program, which is currently in its second year, brings approximately 35 students from around the country into an environment of high expectations, encourages cooperative learning, and demands intensive input from students. This program is an offshoot of another PDP calculus program for UC undergraduates, in which minority students are placed in honors sections of basic calculus courses and given intensive instruction by UC faculty

and graduate students. The program has produced striking increases in participants' grades as well as in higher retention and graduation rates.

In addition to the summer internships and individual campus efforts, the Office of the President and the campus graduate divisions provide support for campus outreach activities such as information dissemination, recruitment travel, student visits, counseling, and workshops and seminars on such subjects as the graduate application process and securing financial support. Universitywide funding for the Summer Research Internship Program and other Graduate Outreach efforts for 1990-91 is $379,000.

PROGRAMS WITH CSU: Because the California State University has more than 65,000 minority students in both undergraduate and master's programs, the University of California is actively working to tap this pool for doctoral programs at UC. Three major efforts have been launched in the last year toward this goal:

(1) CSU-UC Predoctoral Program: Each year 50 underrepresented minority and women students in the California State University system are selected by a CSU-UC Program Advisory Committee to participate in a doctoral preparation program. Each of the selected predoctoral scholars works closely with a CSU faculty sponsor to formulate and develop overall plans designed for enrollment in doctoral programs. There is sufficient funding to enable 30 of the 50 scholars to participate in UC's Summer Research Internship Program or, in the case of CSU master's students, to work independently with a UC faculty member on the student's research interests. The Program is designed to increase enrollment of minority and women students in UC doctoral programs. Funding for the program is $500,000, provided by CSU lottery funds. However, these state lottery funds will no longer be available after 1991-92, and there is currently no other fund source available to continue the program.

(2) California Consortium for Minority Graduate Student Education: Beginning April 1991, UC and CSU will collaborate to bring underrepresented minority undergraduates from throughout California to a day-long forum to provide information and instruction on graduate studies and academic careers. Students attending the forum will attend workshops and seminars (e.g. how to prepare for graduate school, the opportunities academic careers hold for minority students) as well as have an opportunity to discuss specific graduate programs with representatives from colleges and universities from California and throughout the country. The Consortium is sponsoring one forum each year, alternating the location between northern and southern California.

(3) CSU-UC Doctoral Recruitment Network: This network provides CSU faculty with an immediate means of locating the best UC doctoral programs for outstanding CSU undergraduates and masters students interested in obtaining the Ph.D. degree. Specific UC faculty across all disciplines act as initial liaisons, referring CSU faculty to other UC faculty and departments

appropriate to the student's area of study. Extensive discussion between the segments has revealed that faculty-to-faculty contact of this kind is crucial for an increase in the flow of CSU students into UC doctoral programs.

Many of these recruitment efforts are based on the elements of traditional outreach programs, originally designed to increase minority participation at the undergraduate level. UC's early outreach efforts, particularly Early Academic Outreach and MESA, have been quite successful in preparing more minorities for college and for majors in math-based fields. It is too early to determine the effectiveness of most graduate outreach and preparation programs. Moreover, no matter how successful they may turn out to be, these programs presently reach only a small number of minority students. Funding constraints have limited the University's ability to expand these programs to more students.

III. Factors Influencing the Timely Completion of Doctoral Degrees

Part I of this report places the doctoral studies experience of minority and women students in the context of all doctoral students and outlines findings from a recent study of doctoral time to degree. Those findings will not be repeated here. Instead, after highlighting three issues most likely to affect disproportionately the length of time taken by minority and women students to complete their doctoral degrees, we will describe Universitywide strategies developed to address these factors. These three factors are (1) the disciplines in which these students tend to cluster, (2) financial support, and (3) mentorship, integration into the department, and promotion of a campus environment that supports diversity.

In general, it was found (see Part I) that the length of time to complete doctorates in the sciences was the same for minorities and women as for white men. However, most minority and women doctoral students are clustered in the humanities and social sciences, disciplines which traditionally have longer time to degree. In the humanities and social sciences, women and minorities are more likely to spend a longer amount of time completing doctorates than other students (see Graphs 2 and 3). Factors influencing the longer time to degree in these disciplines are discussed in detail in Part I.

Financial support is a crucial factor not only in recruitment, but in ensuring that minority and women doctoral students persist and complete their degrees. The fact that minority students often begin their graduate studies with significant debts incurred from loans to complete baccalaureates makes it no surprise that many minorities, particularly those from low-income families, are not only reluctant to pursue further studies but may need a constant source of

financial support to complete their doctorates.[12] A related factor, as Part I points out, is that minority doctoral recipients are more likely than whites to have dependents (Table 5). These findings suggest the importance of a "minimal comfort level" of financial support necessary for minorities and women, indeed for all graduate students, to remain in doctoral programs long enough to complete their degrees. Yet financial support for graduate students is limited.[13]

In addition to contributing to retention, the level of financial support also affects the time required to complete doctorates. As noted in Part I, there is a consistent pattern across disciplines that students--of any gender or ethnicity--whose major source of financial support is research-related (particularly in the form of research assistantships) finish their doctoral degree more quickly than students who must rely on loans or personal sources of support. Minority students who must rely on loans or outside funding sources take between 10 and 13 years to finish the doctorate, whereas minorities whose primary source

[12]Many minority graduate students come from low-income families. For example, approximately 38% of white students taking the GRE in 1984 had a family income of less than $15,000, while 74% of African Americans and 75% of Chicanos had a comparable family income. According to a 1987 National Research Council report, over half of all students acquire debt, but minorities acquire more than white students. For example, among UC undergraduates entering the doctorate program in 1983, 69% of African Americans graduated with debt averaging $5,446 compared to 26% of whites with an average debt of $4,868.

[13]Although the federal government has a number of important and effective financial support programs for recruitment and support of underrepresented minority graduate students, these funds barely address the need for fellowship and research assistantship support. Moreover, these funds have become much more difficult to obtain as more and more universities across the country compete for funds. For example, the Department of Education's Encouraging Minority Participation in Graduate Education Program has in the past enabled six UC campuses to expand their Summer Research Internship Programs well beyond the numbers they can support with Office of the President funds. In 1990, owing to increased national competition, only two UC campuses received funding from this program. The Department of Education's Patricia Roberts Harris Fellowships for minorities provide stipends of up to $10,000/year for minority graduate students for up to three years. In the past, UC campuses have been able to obtain as many as 25 fellowships per year; however, owing to increased competition, UC received only six new fellowships in 1990. Faced with what is, in essence, a decline in the amount of federal resources available to its students, the University's own financial support packages for minorities and women are at this time insufficient to provide all minorities and women with full multi-year support.

of support is research assistantships take 6.9 years (see Tables 13 and 14). It is noteworthy that whites and Asian Americans were more likely to have research assistantships regardless of discipline, and that they completed their degrees more quickly than non-Asian minorities.

A review of the literature indicates that retention in graduate programs and completion of doctorates is also affected by the ability of institutions and faculty to integrate minority and women students into the department, particularly in fields where they are underrepresented.[14] This integration includes involvement in academic activities in the field (such as attendance at professional meetings, especially local ones) and social activities of the department; participation on research projects under the guidance of a mentor (as in research assistantships); a good working relationship with one's major advisor; and a supportive learning environment.

It was reported in Part I that graduate students tend to base their selection of a faculty advisor on the anticipation of a positive mentor-student relationship with this faculty member, regardless of whether their interest matches that of the faculty member. For some minority students, this decision may be more difficult and time-consuming as they search for a role model. In some instances, the choice of advisor may actually impede the selection of the appropriate dissertation topic, since the interests of the advisor eventually selected may be in areas quite distinct from those of the student. In general, excellent mentorship and advising from faculty has been found to improve retention of minority graduate students. For example, a study of research mentorship teams in a variety of disciplines on one UC campus revealed that mentorship experience improved minority students' ability to approach and interact with faculty and graduate students.[15] The program also helped these students identify dissertation topics as well as identify potential committee members for their dissertation research. Interviews with faculty members in the study supported the students' perceptions. The University has developed a number of programs and efforts to promote a campus climate that supports diversity. Some of these activities were described in a recent legislative report in response to Assembly Concurrent Resolution 126 (Campbell, 1989).

[14]Richard P. Duran and Paula S. Rudolph, "Mentorship and Support Services for Female and Minority Graduate Students," position paper prepared for the All-University Faculty Conference on Graduate Student and Faculty Affirmative Action, February 8-10, 1990, University of California at San Diego.

[15]Duran and Rudolph.

IV. UC Strategies to Assist Minority and Women Graduate Students to Complete Their Doctoral Degrees

Mentorship and financial support are the centerpieces of the University's graduate programs for minorities and women. Awareness of these as factors influencing retention and completion of doctoral degrees has led the University to develop a progression of programs to support minority and women graduate students through their doctoral studies. In order to target critical factors affecting retention and completion of degrees cited earlier, UC has included both research assistantships and dissertation fellowships in the comprehensive design of these programs. However, as the program descriptions below indicate, financial constraints have meant that the University is able to support relatively few minorities and women graduate students in these programs. As additional state funding becomes available, the University will be able to guarantee more students a comprehensive package of support for their graduate studies.

In order to address the need to provide financial support for under-represented minority and women graduate students, the Office of the President has developed a number of financial and academic support programs. The oldest and largest is the **GRADUATE OPPORTUNITY FELLOWSHIP PROGRAM** which provides support up to $8,500 per year plus fees and nonresident tuition. It is designed to be used either on its own or in combination with other funds for the recruitment of underrepresented minority and women graduate students into academic degree programs.

Specifically to assist in the effort to develop future faculty, the University has created the **ACADEMIC CAREER DEVELOPMENT PROGRAM FOR MINORITIES AND WOMEN (ACDP).** Designed to foster the academic career development of historically underrepresented minority and women graduate students, the ACDP consists of the Graduate Mentorship Program, the Research Assistantship/Mentorship Program, and the Dissertation-Year Fellowship Program. The ACDP brings together critical elements of support throughout a graduate student's career, and addresses specific problems in the academic pipeline. The Graduate Mentorship Program immediately links entering students with faculty sponsors, provides the guidance needed at the start of a graduate program, and permits students to focus on the coursework demands of first-year graduate study. The Research Assistantship/ Mentorship Program supports "on-the-job training" for academic careers through research assistantships, which often lay the foundation for dissertation study. Departments are also encouraged to provide teaching assistantships, an important training experience for future faculty positions. Dissertation-Year Fellowships provide financial support through the final year of dissertation work in order to help students complete their graduate study in a timely fashion. Specific program descriptions follow:

Graduate Mentorship Program: This newest component of the Academic Career Development Program for Minorities and Women is specifically designed to attract outstanding students to the University and place them in a "fast-track" for academic careers. Recognizing the need to provide multi-year support packages, the University provides each of these fast-track fellowship holders with $12,500 plus $2,500 for fees and/or expenses for each of the first two years of doctoral study. The Fellowship/Mentorships are awarded competitively by the campus graduate divisions to entering minority men and women graduate students, and to entering nonminority women in those disciplines in which they are underrepresented among UC doctoral recipients and faculty. Priority is given to outstanding doctoral program candidates who demonstrate strong potential for University teaching and research. Each recipient works closely with a faculty sponsor whose role is that of mentor to guide the graduate student through the acquisition of knowledge and skills, the selection of an appropriate dissertation topic, and ultimately to the completion of a doctoral dissertation. Academic departments and the Graduate Divisions are responsible for assisting the student in the selection of an appropriate mentor. A particular objective of this program component is to provide the guidance and advice necessary to place minority and women graduate students on a "fast-track" for academic careers, and thus to increase the flow of high quality minority and women faculty to the University of California. Another purpose is to minimize employment or loan obligations that might serve as a disincentive to graduate study. Initial funding for this program, which began in Fall 1989, was $1 million, which supported 67 students. Beginning in 1990-91, funding will be $2 million, which will support the initial cohort for a second year, as well as a new cohort of 67 first-year students. It is hoped that this program can be augmented with state funding to produce a steady-state program serving 268 students at a time, such that each year 67 new students will be guaranteed four years of support.

Research Assistantship/Mentorship Awards: This program assists academically promising minority graduate students, and women in engineering, mathematics and the physical sciences, to develop advanced research skills under faculty mentorship. The program began in 1984 with $500,000, was expanded to $610,000 in 1987, and to $936,000 in 1988-89. Funds are allocated to campus graduate divisions to provide half-time research assistantships to eligible second-, third-, or fourth-year graduate students who demonstrate high potential and interest in an academic career. A key goal of this program is to assist students in developing advanced research skills through close contact with faculty mentors. Additional goals are (1) to attract minority and women students to academic careers by exposing them to the rewards of university research and teaching; (2) to increase the retention of minority and women graduate students; and (3) to decrease the time to degree for graduate students by reducing reliance on loans and off-campus employment. Minority and women students who enter the program are placed in a research environment at an important point in their academic careers (usually between the second and fourth years), and meet regularly with faculty for consultation on their

classroom and laboratory progress. After leaving the program, students are expected to continue to work with their faculty advisors and to pursue advanced graduate studies leading to the award of the Ph.D. degree. In 1989-90, 108 graduate students on the nine University of California campuses participated in this program. Approximately 30 percent of the awards were made in the disciplines of engineering and the physical and life sciences, approximately 50 percent in the social sciences and humanities, and the remainder in education and various professional fields.

Dissertation-Year Fellowships: This program provides dissertation year support to promising minority graduate students and to women in mathematics, engineering, and the physical sciences to enable them to complete all requirements for the Ph.D. degree in a timely manner, and to qualify them for appointment to the faculty of major universities, including the University of California. The program began in 1986 with $200,000 and currently is funded at $515,000. Each recipient must meet the following eligibility criteria: (1) demonstration of high potential, promise, and desire for an academic career in teaching and research; (2) membership in an underrepresented group; and (3) advancement to candidacy for the Ph.D. degree and satisfactory progress towards its completion such that the dissertation year award will be sufficient for the candidate to complete all Ph.D. degree requirements during the award year. In 1990-91, the program supports 40 Dissertation-Year Fellows. The Fellowship provides a stipend of $12,000 and $500 for research expenses, plus funds to enable the fellows to present their research at another UC campus in preparation for entering the academic % market.

These components of the Academic Career Development Program (ACDP) make it possible for the University to offer entering students five years of mentorship and financial support, consisting of fellowship and research assistantship support (supplemented by departmental teaching assistantships) from the first through fourth years, and a dissertation award for the fifth or final year. Such support, when available, serves as an effective recruitment mechanism for attracting highly qualified minority and women students to the University. Each of these programs has an evaluation component, and the Office of the President has begun tracking alumni of these programs to determine time to degree and eventual employment status.

In addition to the Academic Career Development Program for graduate students, the Office of the President sponsors the **PRESIDENT'S POSTDOCTORAL PROGRAM.** Each year this program places approximately 20 outstanding recent doctoral recipients from throughout the country in two-year postdoctoral research programs on the nine UC campuses. Administered by the Office of the President in cooperation with the campuses, the President's Fellowship is designed (1) to encourage outstanding minority and women Ph.D. degree holders to pursue academic careers, (2) to improve fellows' research skills and enhance their prospects of a successful academic career, and (3) to improve the quality and diversity of university faculties, including that of

the University of California. The program was initiated in 1984 with $500,000, and is currently funded at $1.28 million. Forty-three fellows are currently supported in the program; they include 6 scholars in mathematics and engineering, 10 in physical sciences, 13 in life sciences, 9 in social sciences and 7 in humanities. These fellowships are awarded through annual competitions open to citizens and permanent residents of the United States who are members of historically underrepresented minority groups, and to white women in mathematics, engineering, and physical sciences. Awards are for one academic year with renewal for a second year pending demonstration of satisfactory progress. Awards range from $25,000 to $28,000. Of the fellows who have completed the program, 15 have received tenure track positions at the University of California, 4 in the California State University, and 3 at private universities in California (USC, Occidental and Westmont). Fourteen former fellows are currently continuing in postdoctoral positions (7 at the University of California), and 3 have taken positions in California research institutions.

V. Placement of Minority and Women Doctoral Recipients

In 1988-89, the UC Student Expenses and Resources Survey indicated that minority graduate students in academic programs are as interested as white students (57% vs. 51%) in pursuing an academic career after finishing their degree, and that as many women (53%) as men (51%) have this interest.[16] The University of California is currently implementing a system of annual reports, starting in Fall 1990, on the initial postdoctoral placements of annual cohorts of new UC doctoral degree recipients. The University's report will identify the proportions entering academic or nonacademic positions and the distribution of placements by type and geographical location of the employing institution and by the primary work or study activity. This new source of information will enable the University to evaluate the impact of its initiatives much more effectively: series of these annual reports will permit analysis of trends; thus trend data, in turn, will then be available to inform new initiatives and refinements in existing programs.

[16]At the same time, however, 24% of those minority students who indicate a nonacademic career choice report that they have changed their career objective to a better paying field in order to handle their student loan repayments. This compares to only 5% of Asian-American and 10% of white students.

Recommendations

The studies reported in Parts I and II support the following general conclusions and recommendations with respect to recruitment and timely completion of degrees:

(1) For its faculty to reflect the diversity of the state's population in future years, it is critical for the University to attract more underrepresented minorities and women into doctoral programs and academic careers, particularly in mathematics, science, and engineering, fields in which these students are the most severely underrepresented. Although the University has increased the numbers of minority and women graduate students in all fields over the past decade, the numbers of these students continues to be small. To increase the size of the pool, the University has recently developed a series of outreach and preparation programs, some in collaboration with the California State University, which are designed to identify talented minority and women undergraduates and master's level students, mentor them, and recruit them into doctoral programs at UC.

Recommendation: The Office of the President and campuses should work together, seeking funds as needed and as fiscal circumstances permit, to expand current outreach and recruitment efforts to attract minorities and women into doctoral programs in all fields.

(2) The overall length of time spent at UC to earn a doctorate has increased during the past twenty years: by approximately one year. It has increased most in those disciplines which have traditionally had a longer time to complete the degree, most notably the humanities and social sciences. Since minorities and women tend to cluster in these fields, they, are dispropor- tionately affected.

Recommendation: UC faculty should examine various aspects of doctoral programs, particularly in the humanities and social sciences, to assist students to complete their degrees as expeditiously as possible. Among other activities, this examination should include a consideration of ways to improve the mentoring and advising of graduate students, to integrate students better into the activities of the department and the discipline in all phases of their doctoral programs, and to promote a campus environment that supports diversity; a review of policies on teaching assistantships;

consideration of approaches to ensure that students have apprenticeship opportunities in research; a review program requirements; and a review of expectations of graduate student performance and of practices for disseminating information about these expectations to students.

(3) The findings of this study and the preliminary findings of the University's Joint Advisory Committee on Graduate Student Support conclude that financial support is perhaps the single most critical factor affecting the University's ability to assist doctoral students to complete their degrees in a timely fashion. In order to improve the University's overall efficiency in retention and timely completion of doctoral degrees, increases in support from many sources, including the state and the federal governments, will be necessary. The greatest impact of these funds would be achieved by expanding support in research assistantships for all doctoral students. Minority and women students would be among the major beneficiaries of this strategy.

Recommendation: UC should work with other doctoral institutions to influence federal and state policy in securing increased support, particularly in the form of research assistantships and other graduate assistantships, for all graduate students.

(4) As discussed in Part II, the University has found that a comprehensive, yet flexible, package of financial support targeted to various stages of the doctoral program, and based on satisfactory progress through the program, is the most effective means of ensuring progress to degree. The University has a program for supporting underrepresented minorities and women graduate students, who are in good standing, at key stages of doctoral studies. Currently there are insufficient funds to assure all qualified minority and women doctoral students a minimum of four years of financial support as envisioned by this comprehensive plan.

Recommendation: The Office of the President and the campuses should work together, seeking funds as necessary and as fiscal circumstances permit, to provide to as many minority and women students as possible packages of comprehensive support at a level competitive with other major universities. Such support should come in a form and at a time to serve educational and training goals, as well as to provide financial assistance. These combinations of financial and academic support should include mentored fellowships for beginning doctoral students, research assistantships, teaching assistantships and fellowships to support dissertation studies, along the lines of the model provided by the Academic Career Development Program described in Part II.

(5) Non-academic services, such as low cost, convenient housing and child care are also critical to completion of doctoral degrees, since minorities and women graduate students are often older and have dependents.

Recommendation: The Office of the President and the campuses should work together, seeking funds as necessary and as fiscal circumstances permit, to expand non-academic services to greater numbers of graduate students.

As indicated above, several of the recommendations are directed to the campuses and faculty. These recommendations address the need to expand graduate recruitment efforts, the need to assess the effectiveness of supervision and mentorship, the need to review whether expectations for completing the degree can be restructured to improve time to degree, and the need to study issues with respect to a supportive academic and campus environment for all graduate students. Campuses and appropriate faculty will be asked to respond to these recommendations during the consultation process in the 1990 Fall term.

Appendices

Appendix A: National Research Council Mapping of Majors to Disciplines
Appendix B: Data Sources and Methods
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APPENDIX A

APPENDIX A

NRC
MAPPING OF MAJORS TO DISCIPLINES

ARTS & HUMANITIES
- Archeology
- Art
- Art History
- Classics
- Foreign Languages and Literature
- History
- Letters
- Music
- Philosophy
- Religion
- Theater

ENGINEERING & COMPUTER SCIENCES
- Computer Sciences
- Engineering
- Information Sci & Systems

LIFE SCIENCES
- Agriculture
- Audiology & Speech Pathology
- Biological Sciences
- Environmental Health
- Epidemiology
- Nursing
- Public Health
- Veterinary Medicine
- Zoology

PHYSICAL SCIENCES
- Astronomy
- Atmospheric & Meteorological Sciences
- Chemistry
- Geological Sciences
- Hydrology & Water Resources
- Marine Sciences
- Mathematics
- Oceanography
- Physics

PROFESSIONAL SCHOOLS
- Architecture
- Business & Management
- Communications
- Education
- Home Economics
- Law
- Library & Archival Science
- Public Administration
- Social Work
- Teacher Education
- Teaching Fields

SOCIAL SCIENCES
- Anthropology
- Area Studies
- Demography
- Economics
- Geography
- International Relations
- Political Sciences & Public Policy
- Psychology
- Sociology
- Urban Studies

APPENDIX B

APPENDIX B

Data Sources and Method

The data presented here come from several sources. Historical data from the National Research Council were used to analyze trends in time-to-degree by major fields of study and by student characteristics. These data, which are collected annually from a questionnaire distributed nationwide were also used to show trends in degrees awarded by major fields.

Since the goal of this study is to investigate whether time-to-degree has increased over time, a twenty year period from 1968 until 1988 was chosen and three years in ten year intervals were selected--1968, 1978, and 1988. However, only since 1975 has the federal government required the reporting of race and ethnicity, and therefore any analysis involving ethnic minority students will be between 1978 and 1988. Sometimes, when numbers are small or when a global picture is presented, data from 1980 to 1988 are combined.

When available and appropriate, individual campus data by the UC Graduate Divisions were added to illustrate specific findings.

To pursue the questions of why students in certain fields take a long time to complete their doctoral degree and what improvements might be undertaken, students, faculty, members of the Graduate Councils, and the Graduate Deans and their staff on each campus were interviewed. Each campus was visited for three days. Groups of five to twelve doctoral students selected by major fields were interviewed. Altogether, close to 300 doctoral students were interviewed. In addition, the Graduate Council or selected members of the Council on each campus were interviewed, along with several selected individual faculty

The format of the student interviews was guided by the five major stages of the doctoral program: (1) course work; (2) preparation for and taking the qualifying exam; (3) finding a dissertation topic, selecting an advisor, and writing a prospectus; (4) the actual dissertation research and writing; (5) applying for professional employment. Students were asked to describe what the departmental requirements were, how they moved from one stage to the next, what financial and moral support they had, and what would have helped them at each stage. They were also asked for their recommendations on what the University could do to help students finish more quickly. Only at the very end of the interview was their opinion solicited on the reasons for long time-to-degree in their programs.

APPENDIX C

LIST OF TABLES, GRAPHS, AND FIGURES

TABLES

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1. Doctorate Recipients, by Gender: 1968, 1978, 1988.

2. Doctorate Recipients, by Ethnicity, 1978 and 1988.

3. Doctorate Recipients by Average Age at Degree Completion.

4. Doctorate Recipients by Marital Status.

5. Doctorate Recipients, Percentage with One or More Dependents.

6. Doctoral Recipients by Ethnicity: Institution where Bachelors Earned.

7. Mean Time to Doctoral Degree, All Degree Recipients.

8. Mean Time to Degree, Doctorate Recipients 1980-1988 by Masters' Degree Status

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10. Mean Time to Degree at Doctorate Granting Institution, 1968, 1978, 1988: Time from entry to graduate school to completion of doctoral degree, by discipline and gender.

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18. On-Campus Expenses 1989-90 for Selected Campuses

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21. University of California at Berkeley: Doctoral Progression Status for the 1975-77 Cohort, Total Campus.

22. University of California at Berkeley: Doctoral Progression Status for the 1975-77 Cohort, Eight Major Groups.

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3. Doctoral Requirements 1989-90. UCSB, UCLA, UCI.

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1. Number of Doctorate Degrees Awarded Universitywide by Discipline, 1968, 1978, and 1988.

2. Distribution of Doctoral Recipients by Discipline for Degrees Awarded 1980 to 1988 by Gender.

3. Distribution of Doctoral Recipients by Discipline for Degrees Awarded 1980 to 1988 by Ethnicity.

4. Mean Time to Doctoral Degree, 1980-1988 by Discipline, Asians, Non-Asian Minorities, and Whites.

5. Mean Time to Doctoral Degree, 1980-1988 by Discipline, Men, and Women.

6. Doctoral Completion Rates: 1975-77 Cohort by Eight Fields of Study, as of November, 1988 (University of California at Berkeley).

TABLE 1

University of California
Nine Campuses
Doctorate Recipients by Gender, 1968, 1978, 1988
(Percentages by Field and Percentage Change)

	1968	%	1978	%	1988	%	Percentage Change 1968–78	1978–88	1968–88
MEN									
Arts& Humanities	99	9 0%	165	11.7%	149	10 4%	67%	–10%	51%
Engineering	145	13.3%	214	15 2%	341	23 8%	48%	59%	135%
Life Sciences	271	24.8%	361	25 7%	322	22 5%	33%	–11%	19%
Physical Sciences	309	28 2%	338	24 1%	356	24 9%	9%	5%	15%
Professional Sch	128	11 7%	87	6 2%	82	5 7%	–32%	–6%	–36%
Social Sciences	142	13.0%	240	17 1%	180	12 6%	69%	–25%	27%
All Fields	1,094	100 0%	1,405	100.0%	1,430	100 0%	28%	2%	31%
WOMEN									
Arts& Humanities	32	19 3%	117	27 7%	146	22 4%	266%	25%	356%
Engineering	1	0.6%	5	1.2%	27	4.1%	400%	440%	2600%
Life Sciences	44	26 5%	115	27 2%	193	29 6%	161%	68%	339%
Physical Sciences	14	8 4%	35	8 3%	79	12 1%	150%	126%	464%
Professional Sch.	34	20 5%	66	15 6%	69	10 6%	94%	5%	103%
Social Sciences	41	24 7%	85	20 1%	139	21 3%	107%	64%	239%
All Fields	166	100.0%	423	100 0%	653	100 0%	155%	54%	293%
TOTAL*									
Arts& Humanities	152	10.5%	299	15.1%	323	14.1%	97%	8%	113%
Engineering	170	11.8%	249	12 6%	402	17 5%	46%	61%	136%
Life Sciences	348	24 1%	504	25.5%	568	24 7%	45%	13%	63%
Physical Sciences	377	26.1%	403	20 4%	488	21.3%	7%	21%	29%
Professional Sch.	182	12.6%	170	8 6%	167	7.3%	–7%	–2%	–8%
Social Sciences	215	14 9%	350	17.7%	347	15 1%	63%	–1%	61%
All Fields	1,444	100 0%	1,975	100 0%	2,295	100 0%	37%	16%	59%

* The TOTAL includes those for whom gender is unknown, therefore, the MEN and WOMEN numbers will not sum to the TOTAL

Source UC-NRC tapes, "table1", 9-14-90, jl

TABLE 2

University of California
Nine Campuses
Doctorate Recipients by Ethnicity (U.S. Citizens & Permanent Residents)
1978 & 1988
(Percentages by Field)

1978

	Asian		African American		American Indian		Chicano/ Latino		White		Non-Asian Min. Total		Total Minority		Total Domestic	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Arts&Humanities	3	2 9%	3	9 1%	0	0 0%	17	32 1%	239	17 5%	20	23 0%	23	12.1%	278	16 8%
Engineering & CS	29	28 2%	1	3 0%	0	0 0%	4	7 5%	109	8 0%	5	5 7%	34	17 9%	149	9 0%
Life Sciences	31	30 1%	7	21.2%	1	100 0%	4	7 5%	376	27 6%	12	13.8%	43	22 6%	438	26 5%
Physical Sciences	25	24 3%	6	18 2%	0	0 0%	1	1 9%	287	21.1%	7	8 0%	32	16 8%	341	20 6%
Professional Sch.	8	7.8%	4	12.1%	0	0 0%	11	20 8%	107	7 9%	15	17 2%	23	12 1%	144	8 7%
Social Sciences	7	6 8%	12	36 4%	0	0.0%	16	30 2%	244	17 9%	28	32 2%	35	18 4%	304	18 4%
All Fields	103	100 0%	33	100 0%	1	100.0%	53	100 0%	1,362	100 0%	87	100 0%	190	100 0%	1,654	100 0%

1988

	Asian		African American		American Indian		Chicano/ Latino		White		Non-Asian Min Total		Total Minority		Total Domestic	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Arts&Humanities	15	10 3%	7	17 5%	3	33 3%	17	21 5%	238	16.3%	27	21 1%	42	15 3%	287	16 1%
Engineering & CS	47	32 2%	1	2 5%	0	0 0%	5	6 3%	190	13 0%	6	4.7%	53	19 3%	252	14.1%
Life Sciences	34	23 3%	7	17 5%	1	11.1%	19	24.1%	410	28 0%	27	21.1%	61	22 3%	479	26 8%
Physical Sciences	28	19 2%	4	10 0%	3	33 3%	13	16 5%	298	20 4%	20	15 6%	48	17 5%	360	20 1%
Professional Sch	9	6 2%	9	22 5%	0	0 0%	8	10 1%	96	6 6%	17	13 3%	26	9 5%	124	6 9%
Social Sciences	13	8 9%	12	30 0%	2	22 2%	17	21 5%	232	15 8%	31	24 2%	44	16 1%	285	15 9%
All Fields	146	100 0%	40	100 0%	9	100 0%	79	100 0%	1,464	100 0%	128	100 0%	274	100 0%	1,787	100 0%

Note Includes U S. citizens and permanent residents only (excludes foreign), the Domestic Total includes those for whom ethnicity is unknown

Source· UC-NRC tapes, "table2", 9-14-90, jl

TABLE 3

UNIVERSITY OF CALIFORNIA
NINE CAMPUSES
DOCTORATE RECIPIENTS
BY AVERAGE AGE AT DEGREE COMPLETION

	TOTAL*	MEN*	WOMEN*	WHITE	ASIAN	AFRICAN AMERICAN	CHICANO/ LATINO
ALL DISCIPLINES							
1988	33 3	32 6	34 6	33.3	32.5	37 3	34.1
1978	32.1	31 6	33 8	32.0	31 8	35 1	35 2
1968	32 3	31.9	34 3	N/A	N/A	N/A	N/A
ARTS & HUMANITIES							
1988	36 5	36 1	37 0	36 2	34 3	38 9	38.8
1978	34 0	33 3	35 1	33 8	31 0	37 0	35 9
1968	34.0	33 6	35 2	N/A	N/A	N/A	N/A
ENGINEERING & CS							
1988	31 3	31 3	31 4	31 1	31 7	(31.0)	31.8
1978	31 6	31 6	31 8	33 0	30 8	(31 0)	31 8
1968	31 6	31 6	31.0	N/A	N/A	N/A	N/A
LIFE SCIENCES							
1988	32 4	32 0	32 9	32.3	32 3	34 7	31 8
1978	30 9	30 7	31 7	30 5	32 3	35 9	32 5
1968	31 0	31 1	30 5	N/A	N/A	N/A	N/A
PHYSICAL SCIENCES							
1988	30 9	30 9	31 0	30 6	31 4	32 5	30 7
1978	29 8	29 7	30 4	29 6	30 4	32 5	(28.0)
1968	29 0	29 1	27 7	N/A	N/A	N/A	N/A
PROFESSIONS							
1988	38 0	37.1	39 0	39 0	35 2	43.6	36 8
1978	36 8	36 7	36 9	36.9	37 4	38 0	38 2
1968	39 1	38 4	41 7	N/A	N/A	N/A	N/A
SOCIAL SCIENCES							
1988	35 0	34 8	35 3	35 2	35 0	35 4	34 2
1978	32 9	32 4	34 1	32 5	33 6	34 8	34 5
1968	33 0	32 7	34 0	N/A	N/A	N/A	N/A

Note. Figures for American Indians are not displayed because only 1 American Indian received a Doctorate in 1978 and only 9 American Indians in total received Doctorates in 1988, the means in parentheses ( ) are based on only 1 observation

* Total, Men, and Women include foreign and domestic, and also include those for whom ethnicity/race is unknown

Source: UC-NRC tapes, 'tabs3-5', 9-14-90, JI

TABLE 4

UNIVERSITY OF CALIFORNIA
NINE CAMPUSES
DOCTORATE RECIPIENTS
BY MARITAL STATUS
(Percentage Married)

	TOTAL*	MEN*	WOMEN*	WHITE	ASIAN	AFRICAN AMERICAN	CHICANO/ LATINO
ALL DISCIPLINES							
1988	56%	57%	53%	55%	60%	45%	57%
1978	59%	61%	55%	59%	68%	67%	67%
1968	76%	79%	58%	N/A	N/A	N/A	N/A
ARTS & HUMANITIES							
1988	58%	59%	57%	58%	71%	17%	65%
1978	59%	58%	60%	57%	100%	100%	69%
1968	74%	81%	53%	N/A	N/A	N/A	N/A
ENGINEERING & CS							
1988	61%	61%	61%	55%	75%	(100%)	80%
1978	64%	64%	80%	69%	69%	(100%)	50%
1968	82%	82%	100%	N/A	N/A	N/A	N/A
LIFE SCIENCES							
1988	51%	53%	48%	53%	41%	57%	53%
1978	60%	63%	49%	60%	69%	57%	25%
1968	75%	78%	60%	N/A	N/A	N/A	N/A
PHYSICAL SCIENCES							
1988	50%	50%	49%	50%	41%	75%	43%
1978	52%	52%	50%	51%	52%	83%	(100%)
1968	73%	74%	50%	N/A	N/A	N/A	N/A
PROFESSIONS							
1988	70%	77%	61%	65%	100%	44%	63%
1978	77%	84%	69%	79%	75%	75%	72%
1968	80%	86%	60%	N/A	N/A	N/A	N/A
SOCIAL SCIENCES							
1988	56%	60%	52%	57%	58%	36%	56%
1978	56%	58%	49%	55%	100%	50%	75%
1968	75%	80%	58%	N/A	N/A	N/A	N/A

Note Figures for American Indians are not displayed because only 1 American Indian received a Doctorate in 1978 and only 9 American Indians in total received Doctorates in 1988, the figures in parentheses ( ) are based on only 1 observation.

* Total, Men, and Women include foreign and domestic, and also include those for whom ethnicity/race is unknown

Source: UC-NRC tapes, 'tabs3-5', 9-14-90, jl

TABLE 5

UNIVERSITY OF CALIFORNIA
NINE CAMPUSES
DOCTORATE RECIPIENTS
PERCENTAGE WITH ONE OR MORE DEPENDENTS

	TOTAL*	MEN*	WOMEN*	WHITE	ASIAN	AFRICAN AMERICAN	CHICANO/ LATINO
ALL DISCIPLINES							
1988	41%	46%	29%	35%	43%	41%	60%
1978	50%	55%	33%	48%	55%	67%	54%
1968	72%	80%	19%	N/A	N/A	N/A	N/A
ARTS & HUMANITIES							
1988	42%	50%	33%	39%	46%	40%	73%
1978	42%	45%	37%	41%	0%	100%	31%
1968	74%	86%	28%	N/A	N/A	N/A	N/A
ENGINEERING & CS							
1988	48%	51%	14%	37%	51%	NODATA	50%
1978	62%	64%	0%	63%	68%	(100%)	25%
1968	85%	86%	0%	N/A	N/A	N/A	N/A
LIFE SCIENCES							
1988	34%	41%	22%	31%	38%	33%	50%
1978	49%	57%	22%	48%	53%	57%	33%
1968	71%	79%	11%	N/A	N/A	N/A	N/A
PHYSICAL SCIENCES							
1988	34%	37%	20%	27%	27%	67%	57%
1978	42%	44%	24%	40%	38%	60%	(100%)
1968	69%	71%	17%	N/A	N/A	N/A	N/A
PROFESSIONS							
1988	67%	77%	54%	58%	88%	44%	100%
1978	68%	83%	48%	69%	63%	100%	64%
1968	76%	88%	23%	N/A	N/A	N/A	N/A
SOCIAL SCIENCES							
1988	39%	46%	29%	37%	25%	36%	44%
1978	51%	56%	36%	45%	71%	58%	85%
1968	67%	80%	18%	N/A	N/A	N/A	N/A

Note Figures for American Indians are not displayed because only 1 American Indian received a Doctorate in 1978 and only 9 American Indians in total received Doctorates in 1988, the figures in parentheses ( ) are based on only 1 observation.

* Total, Men, and Women include foreign and domestic, and also include those for whom ethnicity/race is unknown

Source UC-NRC tapes, 'tabs3-5', 9-14-90, JI

TABLE 6

UNIVERSITY OF CALIFORNIA
NINE CAMPUSES
DOCTORAL RECIPIENTS
BY ETHNICITY (U S. Citizens & Permanent Residents)
INSTITUTION WHERE BACHELORS EARNED

	1988					1978				
	ASIAN	AFRICAN AMER	CHICANO/ LATINO	WHITE	DOMESTIC TOTAL	ASIAN	AFRICAN AMER	CHICANO/ LATINO	WHITE	DOMESTIC TOTAL
ALL DISCIPLINES										
UC	30%	15%	29%	33%	32%	34%	9%	45%	31%	31%
CSU	5%	30%	21%	11%	12%	7%	25%	19%	12%	12%
Other Cal	5%	10%	7%	6%	6%	3%	0%	13%	9%	9%
Other US	61%	45%	43%	50%	50%	56%	66%	23%	48%	48%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
ARTS & HUMANITIES										
UC	33%	0%	25%	32%	30%	0%	0%	47%	32%	32%
CSU	7%	57%	31%	10%	13%	33%	33%	18%	11%	13%
Other Cal	7%	14%	13%	8%	9%	0%	0%	18%	13%	12%
Other US	53%	29%	31%	51%	49%	67%	67%	18%	44%	43%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
ENGINEERING & CS										
UC	22%	N=1	20%	29%	28%	29%	N=1	50%	30%	30%
CSU	2%	0%	40%	6%	6%	4%	0%	0%	7%	6%
Other Cal	2%	0%	0%	4%	4%	0%	0%	0%	7%	6%
Other US	73%	0%	40%	61%	62%	68%	0%	50%	57%	59%
Total	100%	N=1	100%	100%	100%	100%	N=1	100%	100%	100%
LIFE SCIENCES										
UC	34%	29%	21%	35%	34%	40%	0%	0%	35%	34%
CSU	9%	0%	11%	12%	11%	7%	29%	50%	15%	15%
Other Cal	3%	14%	5%	5%	5%	0%	0%	0%	7%	7%
Other US	53%	57%	63%	48%	49%	53%	71%	50%	43%	44%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
PHYSICAL SCIENCES										
UC	39%	0%	31%	26%	27%	28%	0%	0%	25%	26%
CSU	4%	0%	23%	10%	10%	12%	0%	0%	7%	8%
Other Cal	11%	25%	8%	9%	9%	8%	0%	100%	9%	9%
Other US	46%	75%	38%	56%	54%	52%	100%	0%	59%	57%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
PROFESSIONAL SCHOOLS										
UC	11%	0%	57%	34%	31%	50%	0%	45%	29%	29%
CSU	0%	56%	29%	15%	19%	0%	25%	27%	14%	14%
Other Cal	0%	11%	14%	9%	8%	13%	0%	9%	9%	11%
Other US	89%	33%	0%	43%	42%	38%	75%	18%	48%	45%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
SOCIAL SCIENCES										
UC	31%	25%	33%	40%	39%	43%	17%	56%	31%	32%
CSU	8%	25%	13%	14%	14%	0%	33%	13%	15%	15%
Other Cal	8%	0%	0%	4%	4%	0%	0%	13%	9%	8%
Other US	54%	50%	53%	42%	43%	57%	50%	19%	44%	45%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Note Includes U S citizens and permanent residents only (excludes foreign), the Domestic Total includes American Indians and those for whom ethnicity is unknown; figures for American Indians are not displayed because only 1 American Indian received a Doctorate in 1978 and only 9 American Indians in total received Doctorates in 1988

Source. UC-NRC tapes, 'TABLE6', 9-14-90, jl

TABLE 7

University of California
Nine Campuses
Mean Time to Doctoral Degree
All Degree Recipients*

All Fields	1968	1978	1988
BA-PhD	9.1	9.1	10.0
Pre-Grad	1.1	1.0	1.2
Entry-PhD	8.0	8.1	8.9
MA Time	1.6	1.6	1.7
MA-PhD	6.4	6.5	7.2
Registered	5.9	6 5	7.4
Withdrawn	2.1	1.6	1.5

* Includes graduate study time at institutions other than UC.

Source UC-NRC tapes, "TABLE7", 9-14-90, JL

TABLE 8

University of California
NINE CAMPUSES
Mean Time to Degree
Doctorate Recipients, 1980–1988

	NO MASTERS			MASTERS OTHER INSTITUTION			MASTERS SAME CAMPUS		
	BA-PHD	GRAD-PHD	REG-PHD	BA-PHD	GRAD-PHD	REG-PHD	BA-PHD	GRAD-PHD	REG-PHD
Arts & Humanities	10 6	9.0	8 1	14 6	13.0	9.6	11.6	10 5	8 7
Engineering & CS	7 6	6 4	6.1	10.6	9 7	7.4	8 3	7 1	6 4
Life Sciences	7.9	7.0	6.6	11 6	10.5	8 2	10.2	8 7	7.2
Physical Sciences	7.1	6 5	6 2	10 4	9 7	8.1	8 2	7.5	6 9
Professional Schools	12.1	9 9	7.8	15.5	13 7	8 9	13.7	11.5	8 6
Social Sciences	9 6	8 4	7 5	13 1	11 9	9.0	10 2	9.2	7 8
ALL DISCIPLINES	8 0	7.5	6.6	12.6	11 4	8.5	10.0	8.9	7 5

Source UC-NRC tapes, 'table8',9-14-90,jl

TABLE 9

University of California
NINE CAMPUSES
Doctorate Recipients, 1968, 1978, and 1988
Proportion of Doctoral Recipients by Masters Degree Status

	NO MASTERS			MASTERS OTHER INSTITUTION			MASTERS SAME CAMPUS		
	1968	1978	1988	1968	1978	1988	1968	1978	1988
Arts & Humanities	10%	14%	11%	40%	32%	39%	50%	54%	50%
Engineering & CS	10%	12%	14%	44%	41%	40%	47%	47%	46%
Life Sciences	44%	48%	50%	38%	29%	31%	18%	24%	19%
Physical Sciences	46%	46%	50%	24%	19%	21%	30%	35%	29%
Professional Schools	6%	7%	9%	64%	65%	62%	31%	27%	29%
Social Sciences	29%	23%	20%	35%	27%	36%	36%	50%	44%
ALL DISCIPLINES	30%	30%	30%	38%	31%	35%	32%	38%	35%

Note: Ns are taken from the counts of GRAD-PHD (Time from entry in any graduate program to Ph D)

Source UC-NRC tapes, 'table9',9-14-90,jl

TABLE 10

University of California
Nine Campuses
Mean Time to Degree at
*DOCTORATE GRANTING INSTITUTION**
1968, 1978, 1988
(Time from Entry to Graduate School to Completion of Doctoral Degree)

	Mean Time			
MEN	1968	1978	1988	Years Difference 1968–1988
Arts & Humanities	8.3 (62)	9 4 (108)	10.2 (87)	1.9
Engineering & CS	6.3 (81)	6 7 (125)	6.3 (203)	0 0
Life Sciences	5 9 (162)	6.3 (252)	6 9 (225)	1.0
Physical Sciences	5.4 (233)	6.3 (275)	6.7 (281)	1 3
Professional Sch.	10.7 (46)	8 5 (35)	10.1 (35)	−0 6
Social Sciences	6.9 (88)	7.6 (170)	8.9 (112)	2 0
All Fields	6 5 (672)	7 0 (965)	7 4 (943)	0.9

WOMEN	1968	1978	1988	Years Difference 1968–1988
Arts & Humanities	7.9 (17)	8 9 (84)	10 5 (92)	2 6
Engineering & CS	9.0 (1)	8 5 (4)	6 7 (18)	--
Life Sciences	6.8 (33)	6 6 (88)	7 5 (130)	0.7
Physical Sciences	5 4 (11)	6 8 (27)	6.4 (63)	1 0
Professional Sch	13 3 (13)	10 4 (18)	11.0 (23)	−2 3
Social Sciences	7.6 (31)	8 4 (68)	8 6 (93)	1 0
All Fields	7.9 (106)	8 0 (289)	8.4 (419)	0 5

TOTAL	1968	1978	1988	Years Difference 1968–1988
Arts & Humanities	8 2 (79)	9 2 (192)	10.3 (179)	2 1
Engineering & CS	6 4 (82)	6 8 (129)	6 3 (221)	−0.1
Life Sciences	6 0 (195)	6.4 (340)	7.1 (355)	1 1
Physical Sciences	5.4 (244)	6 3 (302)	6 6 (344)	1.2
Professional Sch.	11.3 (59)	9.2 (53)	10.4 (58)	−0.9
Social Sciences	7 1 (119)	7.8 (238)	8.8 (205)	1.7
All Fields	6 7 (778)	7.2 (1,254)	7 7 (1,362)	1 0

*Time to degree was calculated for only those doctorate recipients who received a masters degree at the same campus at which they earned their doctorate and for those who received no masters degree.

Source: UC-NRC tapes, J L., "table10", 9-14-90, jl

TABLE 11

University of California
Nine Campuses
Mean Time to Doctoral Degree at
*DOCTORATE GRANTING INSTITUTION**

	1968	1978	1988
ALL DISCIPLINES			
BA-PhD	7.8	8 2	8 8
Pre-Grad	1.2	0 9	1 1
Entry-PhD	6 7	7.2	7.7
Registered	5 4	6 1	6 8
Withdrawn	1.2	1.1	0 9
ARTS & HUMANITIES			
BA-PhD	10 2	10 3	11.8
Pre-Grad	2 0	1.1	1.5
Entry-PhD	8 2	9.2	10 3
Registered	6 2	7.4	8 7
Withdrawn	2.0	1 8	1.7
ENGINEERING & CS			
BA-PhD	7 7	8 1	7 5
Pre-Grad	1 4	1.3	1 2
Entry-PhD	6 4	6 8	6 3
Registered	5 3	5 8	5 8
Withdrawn	1 1	1 0	0 6
LIFE SCIENCES			
BA-PhD	7 1	7 2	8 1
Pre-Grad	1 1	0 9	1 1
Entry-PhD	6 0	6 4	7.1
Registered	5 2	5.7	6 3
Withdrawn	0.8	0.7	0.8
PHYSICAL SCIENCES			
BA-PhD	6 0	6 8	7.3
Pre-Grad	0 6	0 4	0 7
Entry-PhD	5 4	6 3	6 6
Registered	5 0	5 7	6 3
Withdrawn	0 4	0.6	0.3
PROFESSIONS			
BA-PhD	13 0	11 2	12 9
Pre-Grad	1 7	2 0	2 5
Entry-PhD	11.3	9 2	10 4
Registered	6 5	6 8	8 0
Withdrawn	4.9	2 4	2.4
SOCIAL SCIENCES			
BA-PhD	8.3	8 9	10 0
Pre-Grad	1.2	1 1	1.2
Entry-PhD	7 1	7.8	8.8
Registered	5 5	6 5	7.4
Withdrawn	1.6	1.3	1.4

* Time to degree was calculated for only those doctorate recipients who received a masters degree at the same campus at which they earned their doctorate and for those who received no masters degree

Source UC-NRC tapes, "table11",9-14-90, JL

TABLE 12

University of California
Nine Campuses
Mean Time to Degree at
*DOCTORATE GRANTING INSTITUTION**
1978 and 1988
(Time from Entry to Graduate School to Completion of Doctoral Degree)

Mean Time

ASIAN	1978		1988		Years Difference 1978–1988
Arts and Humanities	7.7	(3)	10 0	(9)	2 3
Engineering	6 9	(19)	6 5	(22)	–0.4
Life Sciences	6.6	(23)	7 2	(22)	0.6
Physical Sciences	5.7	(15)	6.8	(19)	1 1
Professional Sch	12.0	(1)	10.0	(3)	--
Social Sciences	10 6	(5)	8 0	(7)	–2 6
All Fields	6 9	(66)	7 4	(82)	0 5

NON–ASIAN MINORITY	1978		1988		Years Difference 1978–1988
Arts and Humanities	9 5	(14)	10 3	(16)	0 8
Engineering	6.5	(5)	7.7	(4)	1.2
Life Sciences	5 7	(7)	7.5	(15)	1 8
Physical Sciences	6 3	(4)	7 1	(15)	0 8
Professional Sch.	8 5	(4)	10 3	(6)	1 8
Social Sciences	7 2	(20)	8 2	(18)	1 0
All Fields	7 5	(54)	8 4	(74)	0 9

WHITE	1978		1988		Years Difference 1978–1988
Arts and Humanities	9.2	(170)	10 4	(140)	1.2
Engineering	7.8	(68)	6.9	(124)	–0 9
Life Sciences	6.4	(276)	7.2	(287)	0 8
Physical Sciences	6 4	(240)	6.7	(239)	0 3
Professional Sch.	9.9	(37)	11.4	(38)	1 5
Social Sciences	8 0	(191)	9 2	(153)	1.2
All Fields	7 4	(982)	8.0	(981)	0.6

* Time to degree was calculated for only those doctorate recipients who received a masters degree at the same campus at which they earned their doctorate and for those who received no masters degree

Source: UC–NRC tapes, J L "table12", 9–14–90, jl

TABLE 13

UNIVERSITY OF CALIFORNIA
Nine Campuses
DISTRIBUTION OF PRIMARY SUPPPORT
DOCTORATES AWARDED 1980-1988

	TOTAL*	MEN*	WOMEN*	ASIANS	WHITES	TOTAL NON-ASIAN MINORITIES	AFRICAN AMERICANS	CHICANOS/ LATINOS
ALL DISCIPLINES								
Fellowship	22%	21%	22%	23%	21%	33%	38%	32%
Loans	1%	1%	1%	1%	1%	2%	3%	1%
Other/Own	30%	27%	38%	20%	31%	36%	38%	34%
Own	*17%*	*15%*	*21%*	*12%*	*19%*	*27%*	*31%*	*25%*
Spouse	*8%*	*5%*	*13%*	*5%*	*9%*	*7%*	*6%*	*7%*
Family	*2%*	*2%*	*2%*	*3%*	*2%*	*1%*	*<1%*	*<1%*
Other	*3%*	*4%*	*2%*	*0%*	*1%*	*1%*	*1%*	*2%*
RA	28%	32%	17%	41%	26%	13%	7%	15%
TA	19%	18%	21%	15%	20%	16%	13%	18%
ARTS & HUMANITIES								
Fellowship	12%	15%	10%	16%	10%	23%	41%	18%
Loans	2%	1%	2%	4%	2%	2%	5%	1%
Other/Own	38%	36%	42%	31%	39%	40%	31%	43%
RA	2%	2%	2%	11%	2%	1%	0%	1%
TA	45%	46%	44%	38%	47%	34%	23%	38%
ENGINEERING & CS								
Fellowship	18%	18%	24%	12%	22%	28%	30%	30%
Loans	1%	1%	1%	0%	1%	0%	0%	0%
Other/Own	26%	26%	29%	23%	28%	36%	30%	39%
RA	49%	50%	43%	59%	45%	31%	40%	26%
TA	6%	6%	2%	7%	5%	5%	0%	4%
LIFE SCIENCES								
Fellowship	37%	36%	38%	45%	37%	43%	46%	44%
Loans	1%	1%	1%	0%	1%	1%	3%	0%
Other/Own	22%	21%	25%	15%	20%	17%	21%	13%
RA	29%	31%	25%	29%	29%	30%	21%	35%
TA	11%	11%	11%	11%	12%	9%	10%	8%
PHYSICAL SCIENCES								
Fellowship	15%	15%	17%	15%	15%	24%	19%	27%
Loans	0%	0%	0%	0%	0%	0%	0%	0%
Other/Own	14%	15%	12%	7%	14%	12%	6%	10%
RA	49%	49%	50%	60%	52%	38%	19%	39%
TA	21%	22%	20%	18%	20%	27%	56%	24%
PROFESSIONAL SCHOOLS								
Fellowship	13%	15%	11%	19%	8%	23%	26%	23%
Loans	2%	2%	2%	0%	3%	2%	2%	2%
Other/Own	72%	66%	77%	55%	75%	73%	70%	74%
RA	8%	9%	7%	14%	8%	1%	0%	2%
TA	6%	7%	4%	13%	5%	1%	2%	0%
SOCIAL SCIENCES								
Fellowship	21%	21%	21%	23%	18%	44%	46%	45%
Loans	2%	3%	2%	2%	3%	3%	4%	3%
Other/Own	40%	38%	42%	31%	41%	38%	35%	35%
RA	11%	12%	10%	14%	12%	3%	4%	3%
TA	25%	26%	25%	30%	26%	13%	12%	15%

* Total, Men, and Women include all foreign and domestic, and also include those for whom ethnicity/race is unknown
Note American Indians are included in the TOTAL NON-ASIAN MINORITIES and in the TOTAL, MEN and WOMEN figures
Source UC-NRC tapes, "table13", 9-14-90, JI

TABLE 14

UNIVERSITY OF CALIFORNIA
Nine Campuses
MEAN TIME FROM GRADUATE ENTRY TO PHD
DOCTORATES AWARDED 1980-1988

	TOTAL*	MEN*	WOMEN*	ASIANS	WHITES	TOTAL NON-ASIAN MINORITIES	AFRICAN AMERICANS	CHICANOS/ LATINOS
ALL DISCIPLINES								
Fellowship	7.9	7.7	8.2	7.8	7.7	9.1	10.5	8.0
Loans	9.4	9.2	9.8	11.8	9.4	10.1	8.9	11.8
Other/Own	11.0	10.3	12.1	10.4	11.4	13.0	15.5	11.5
Own	*12.0*	*11.6*	*12.7*	*10.6*	*12.1*	*13.8*	*16.4*	*11.9*
Spouse	*10.5*	*9.1*	*11.8*	*11.4*	*10.4*	*11.3*	*12.8*	*10.3*
Family	*8.7*	*8.2*	*9.7*	*8.8*	*9.4*	*9.0*	—	*11.0*
Other	*8.8*	*8.5*	*9.6*	*6.5*	*10.4*	*9.7*	*9.0*	*10.0*
RA	7.0	6.9	7.3	7.3	7.0	6.9	8.3	6.7
TA	8.3	8.0	8.9	8.0	8.5	8.9	8.9	8.8
ARTS & HUMANITIES								
Fellowship	9.9	9.8	10.0	12.1	9.9	9.7	9.9	9.9
Loans	10.9	10.4	11.4	13.5	10.4	14.7	12.0	20.0
Other/Own	12.1	11.6	12.5	16.4	12.0	12.5	12.1	12.2
RA	9.7	9.3	10.1	9.8	9.8	9.0	--	9.0
TA	9.8	9.5	10.2	10.5	9.9	10.2	9.9	10.4
ENGINEERING & CS								
Fellowship	7.9	7.9	7.6	8.4	7.8	7.7	6.0	8.3
Loans	8.7	8.7	9.0	6.0	9.4	--	--	--
Other/Own	9.3	9.2	10.1	8.9	10.7	11.1	10.7	11.4
RA	6.7	6.6	7.0	6.9	6.8	6.5	8.5	5.7
TA	7.2	7.2	5.7	8.2	7.4	5.0	--	3.0
LIFE SCIENCES								
Fellowship	7.4	7.2	7.6	7.3	7.2	8.2	10.9	6.9
Loans	7.4	7.7	6.8	6.0	7.6	6.0	6.0	--
Other/Own	9.9	9.1	11.2	9.3	10.2	12.5	17.5	9.6
RA	7.3	7.2	7.3	8.0	7.2	6.8	7.4	6.9
TA	7.6	7.4	8.0	7.3	7.6	7.9	8.8	7.1
PHYSICAL SCIENCES								
Fellowship	6.5	6.4	6.6	6.8	6.4	7.2	9.0	6.5
Loans	7.8	8.3	6.0	--	7.8	--	--	--
Other/Own	9.0	9.0	9.2	10.1	9.3	8.0	7.0	8.0
RA	6.5	6.6	6.2	7.0	6.4	6.8	8.0	6.4
TA	6.8	6.8	6.7	6.8	6.8	6.9	7.3	6.4
PROFESSIONAL SCHOOLS								
Fellowship	10.3	10.1	10.5	9.8	10.8	10.4	10.6	10.0
Loans	10.3	9.7	11.2	--	10.6	7.0	4.0	10.0
Other/Own	13.3	12.8	13.9	11.1	13.7	15.3	17.2	13.3
RA	9.7	9.5	10.0	10.4	9.9	6.0	--	6.0
TA	9.3	9.3	9.2	8.8	9.7	9.0	9.0	--
SOCIAL SCIENCES								
Fellowship	8.7	8.6	9.0	8.0	8.5	9.6	10.9	8.2
Loans	9.2	9.3	9.2	16.0	9.0	9.5	9.3	9.7
Other/Own	10.8	10.6	10.9	10.7	10.8	11.9	14.8	9.6
RA	8.1	8.0	8.2	8.0	8.0	9.5	10.7	8.3
TA	8.4	8.5	8.2	7.9	8.4	8.7	9.4	7.7

* Total, Men, and Women include foreign and domestic, and also include those for whom ethnicity/race is unknown
Note American Indians are included in the TOTAL NON-ASIAN MINORITIES and in the TOTAL, MEN, and WOMEN figures
Source UC-NRC tapes, "table14", 9-14-90, jl

TABLE 15

University of California at Berkeley
Relationship between Years of Teaching Assistantship and Time to Degree
Doctorate Recipients, May 1986 – May 1989
For Five Selected Departments in the Humanities and Social Sciences

Years of Teaching	Time to Degree MEAN	Time to Degree MEDIAN	N Students
4 or More Years of Teaching Assistantship	10 1	9.6	27
Less than 4 Years of Teaching Assistantship	9 0	8.2	195
3 or more Years of Teaching Assistantship	9 9	9.2	65
Less than 3 Years of Teaching Assistantship	8.8	7.6	157
ALL STUDENTS.	9 1	8.2	222

* Calculation is based on 12 months of teaching

Source: UCB, Graduate Division, BSPT5 WK1 FC, "tatime", 4-18-90, mn

TABLE 16

Student Expenses, Student Fees and Financial Support In 1988 Constant Dollars

Years	Average Budget*	Living Costs	Fees	Tuition	Average Support (All Sources)	% Budget Covered By Financial Support
80-81	8,909	7,130	1,145	3,335	6,537	73%
82-82	10,611	8,119	1,664	3,895	6,155	58%
84-85	11,044	8,503	1,593	4,149	7,078	64%
86-87	11,341	8,858	1,513	4,458	7,231	64%
88-89	12,007	9,382	1,559	4,806	7,671	64%

Source: 1988-89 Report on Student Financial Support

*Includes living costs, fees, and a prorated amount of tuition based on nonresident enrollment

TABLE 17

University of California
Nine Campuses
PERCENT ACCUMULATING DEBT
Doctoral Recipients (U.S. Citizens & Permanent Residents), 1988

	TOTAL	MEN	WOMEN	ASIANS	WHITES	TOTAL NON-ASIAN MINORITIES	AFRICAN AMERICANS	CHICANOS/ LATINOS
ALL DISCIPLINES								
No debt	41%	41%	40%	46%	42%	23%	21%	24%
Accumulated debt	59%	59%	60%	54%	58%	77%	79%	76%
Up to $5K	35%	32%	40%	45%	36%	27%	39%	20%
$5,001 - $10K	30%	31%	28%	29%	29%	36%	23%	47%
$10,001 - $20K	23%	26%	20%	14%	25%	16%	13%	19%
More than $20K	12%	11%	12%	12%	11%	21%	26%	14%
ARTS & HUMANITIES								
No debt	44%	39%	50%	36%	45%	37%	43%	29%
Accumulated debt	56%	61%	50%	64%	55%	63%	57%	71%
Up to $5K	40%	37%	43%	44%	40%	35%	50%	33%
$5,001 - $10K	25%	20%	29%	33%	24%	24%	0%	33%
$10,001 - $20K	22%	28%	15%	0%	24%	18%	25%	17%
More than $20K	14%	14%	13%	22%	12%	24%	25%	17%
ENGINEERING & CS								
No debt	53%	54%	48%	47%	55%	50%	0%	60%
Accumulated debt	47%	46%	52%	53%	45%	50%	100%	40%
Up to $5K .	38%	38%	43%	40%	40%	0%	0%	0%
$5,001 - $10K	34%	35%	29%	36%	32%	67%	0%	100%
$10,001 - $20K	19%	19%	14%	12%	21%	0%	0%	0%
More than $20K	9%	8%	14%	12%	7%	33%	100%	0%
LIFE SCIENCES								
No debt	35%	35%	35%	38%	35%	15%	14%	16%
Accumulated debt	65%	65%	65%	63%	65%	85%	86%	84%
Up to $5K	33%	28%	40%	30%	33%	30%	50%	19%
$5,001 - $10K	30%	32%	26%	30%	26%	61%	33%	75%
$10,001 - $20K	28%	30%	24%	25%	30%	4%	0%	6%
More than $20K	10%	10%	10%	15%	10%	4%	17%	0%
PHYSICAL SCIENCES								
No debt	44%	45%	39%	56%	45%	10%	0%	15%
Accumulated debt	56%	55%	61%	44%	55%	90%	100%	85%
Up to $5K	32%	32%	33%	83%	31%	11%	25%	0%
$5,001 - $10K	35%	34%	40%	17%	37%	28%	0%	45%
$10,001 - $20K	23%	24%	19%	0%	24%	33%	25%	36%
More than $20K	10%	10%	7%	0%	7%	28%	50%	18%
PROFESSIONS								
No debt	43%	37%	47%	67%	42%	24%	33%	13%
Accumulated debt	58%	63%	53%	33%	58%	76%	67%	88%
Up to $5K	38%	41%	34%	67%	40%	23%	50%	0%
$5,001 - $10K	25%	26%	23%	33%	23%	31%	33%	29%
$10,001 - $20K	16%	15%	17%	0%	17%	15%	17%	14%
More than $20K	22%	18%	26%	0%	21%	31%	0%	57%
SOCIAL SCIENCES								
No debt	33%	32%	33%	38%	34%	21%	9%	31%
Accumulated debt	67%	68%	67%	62%	66%	79%	91%	69%
Up to $5K	35%	28%	43%	38%	36%	35%	30%	45%
$5,001 - $10K	28%	29%	27%	13%	28%	26%	30%	27%
$10,001 - $20K	23%	27%	19%	38%	24%	17%	10%	27%
More than $20K	13%	15%	12%	13%	13%	22%	30%	0%

Note The TOTAL and the TOTAL NON-ASIAN MINORITIES include American Indians and those for whom ethnicity is unknown figures for American Indians are not displayed because only 1 American Indian received a Doctorate in 1978 and only 9 American Indians in total received Doctorates in 1988
Source UC-NRC tapes, "TABLE17", 9-14-90, JJ

TABLE 18

On-Campus Housing Expenses 1989-90
for Selected Campuses

Campus	Housing Expenses	
	Single	Family
Berkeley	NA	$290 00
Davis	$290 00	$393 00
Irvine	$255 00	$506 00
Santa Barbara	$418 00	$436 00
Santa Cruz	$432 00	$470 00
San Diego	$435 00	$529 00
San Francisco	$245 00	$570 00

Source Campus Housing Offices

TABLE 19

Campus Child Care: 1987-88

Campus	Lic Cpty	Ages Served	Fees	# Children Served By parental status					# Children on Wait List By Parental Status					# Graduate Student Parents		Total Grad Parents
				Fac	Staff	Stud	Com	Total	Fac	Staff	Stud	Com	Total	Married	Single	
Berkeley	201	3 mos - 8 years	$360/mo		0	201	0	201	NA	NA	65	NA	65	1012	316	1328
Davis	85	6 mos - 5 years	$218/qtr	inc	20	36	20	76	32	122	46	200	400	565	187	752
Irvine	124	3 mos - 12 years	$440/mo ft $200/mo ht	16	34	121	26	197	Inc	482	314	23	819	355	355	456
Los Angele	80	2 mos - 60 mos	$480/mo	5	27	44	15	91	Inc	336	222	NA	558	1498	289	1787
Riverside	78	2 5 - 5 years	$1 23/hr	16	14	55	0	85	NA	NA	NA	NA	0	320	93	413
Santa Barb	132	15 mos - 7 years	$325/mo	13	11	54	15	93	Inc	31	58	10	99	235	145	380
Santa Cruz	45	3 mos - 9 years	$480/mo		0	43	0	43	NA	NA	NA	NA	0	97	44	141
San Diego	75	11 mos - 5 5 yrs	$380/mo	25	25	25	0	75	Inc	160	80	0	240	307	115	422
San Francis	48	2 - 5 years	$495/mo	Inc	40	20	6	66	Inc	120	60	31	211	365	116	481
TOTAL	872				171	599	82	927		1161	877	110	2148	4754	1406	6160

Source The Challenge of Dependent Care Systemwide Office of Employee Relations, 1989

Table 20

University of California at Berkeley· Graduate Division

GRADUATE STUDENT RETENTION FOR DOCTORAL STUDENTS BY ETHNICITY COHORT 1975-77

Ethnic Group	*Doctoral degree awarded as of May 88*		*Master's degree awarded as of May 88*		*No degree or pending* as of Nov 88*		*Total Graduate Degrees awarded as of Nov 88*		*Total N*
All Minority	45%	(183)	26%	(107)	29%	(116)	71%	(290)	406
Asian	50%	(111)	24%	(53)	26%	(59)	74%	(164)	223
American Indian	39%	(37)	27%	(25)	34%	(32)	66%	(62)	94
African American	40%	(31)	31%	(24)	29%	(23)	71%	(55)	78
Chicano/Latino	36%	(4)	45%	(5)	18%	(2)	82%	(9)	11
Non-Asian Minority	39%	(72)	30%	(54)	31%	(57)	69%	(126)	183
White	52%	(1,200)	23%	(538)	24%	(558)	76%	(1,738)	2296
Foreign	60%	(361)	24%	(144)	17%	(101)	83%	(505)	606
Other	40%	(55)	29%	(40)	32%	(44)	68%	(95)	139
Total	52%	(1,799)	24%	(829)	24%	(819)	76%	(2,628)	3447

* We know from the doctoral progression status study of the 1975-77 cohort that 6% (200) of the cohort were pending as of Nov 1988 We can expect that about half of all pending students will receive a doctoral degree Overall, about 80% of all doctoral students leave Berkeley with a graduate degree about 55% receive a doctoral degree and 24% a master's degree

Source Historical File, run date 10-24-88 "scr\ethndoc", 8-27-90, mn

Table 21

University of California at Berkeley
Doctoral Progression Status for the 1975–77 Cohort
TOTAL CAMPUS

		*Attrition Rate Year 1-3**		*Attrition Rate Year 4-12**		*Pending as of Nov 88*		*Degree awarded as of May 88*		*Total*
			N		*N*		*N*		*N*	*N***
Men										
	All Minority	35%	93	12%	33	6%	17	46%	123	266
	White	29%	435	11%	158	5%	79	55%	827	1499
	Foreign	31%	161	6%	32	2%	13	60%	315	521
	Others/Unknown	31%	33	17%	18	7%	7	45%	48	106
	Total Students	30%	722	10%	241	5%	116	55%	1313	2392
Women										
	All Minority	37%	51	12%	17	9%	13	42%	58	139
	White	30%	241	15%	118	9%	70	46%	366	795
	Foreign	35%	30	8%	7	4%	3	53%	45	85
	Others/Unknown	42%	14	30%	10	9%	3	18%	6	33
	Total Students	32%	336	14%	152	8%	89	45%	475	1052
Total										
	All Minority	36%	144	12%	50	7%	30	45%	181	405
	White	29%	676	12%	276	6%	149	52%	1193	2294
	Foreign	32%	191	6%	39	3%	16	59%	360	606
	Others/Unknown	34%	47	20%	28	7%	10	39%	54	139
	Total Students	31%	1058	11%	393	6%	205	52%	1788	3444

* Could include students who have left after obtaining only the master's degree

** Number of students who entered the program between Fall 1975 and Spring 1978

Source Graduate Division, UCB, as of Nov 1988 "scr/attri-short", 8-27-1990, mn

Table 22

University of California at Berkeley

Doctoral Progression Status for the 1975–77 Cohort

EIGHT MAJOR GROUPS

	*Attrition Rate Year 1-3**	*N*	*Attrition Rate Year 4-12*	*N*	*Pending as of Nov 88*	*N*	*Degree awarded as of May 88*	*N*	*Total N***
MEN									
Arts	30%	12	10%	4	3%	1	58%	23	40
Biological Sc.	24%	44	3%	6	2%	4	70%	128	182
Engineering	36%	214	7%	44	2%	12	55%	330	600
Lang & Lit	40%	77	20%	38	8%	16	32%	62	193
Nat Resources	24%	27	10%	11	7%	8	59%	67	113
Physical Sc.	23%	141	9%	54	2%	10	67%	413	618
Professional Sch.	36%	92	16%	40	6%	16	42%	105	253
Social Sc.	29%	115	11%	44	12%	49	47%	185	393
Total	30%	722	10%	241	5%	116	55%	1313	2392
WOMEN									
Arts	38%	15	23%	9	18%	7	23%	9	40
Biological Sc	30%	29	4%	4	1%	1	65%	64	98
Engineering	51%	20	5%	2	3%	1	41%	16	39
Lang & Lit	34%	68	25%	51	15%	30	26%	53	202
Nat. Resources	19%	11	16%	9	0%	0	65%	37	57
Physical Sc	26%	27	7%	7	2%	2	65%	66	102
Professional Sch	33%	81	13%	32	7%	17	47%	114	244
Social Sc	31%	85	14%	38	11%	31	43%	116	270
Total	32%	336	14%	152	8%	89	45%	475	1052
TOTAL STUDENTS									
Arts	34%	27	16%	13	10%	8	40%	32	80
Biological Sc	26%	73	4%	10	2%	5	69%	192	280
Engineering	37%	234	7%	46	2%	13	54%	346	639
Lang & Lit	37%	145	23%	89	12%	46	29%	115	395
Nat Resources	22%	38	12%	20	5%	8	61%	104	170
Physical Sc	23%	168	8%	61	2%	12	67%	479	720
Professional Sch	35%	173	14%	72	7%	33	44%	219	497
Social Sc	30%	200	12%	82	12%	80	45%	301	663
Total	31%	1058	11%	393	6%	205	52%	1788	3444

* Could include students who left after obtaining only the master's degree

** Number of students who entered the program between Fall 1975 and Spring 1978

Source Graduate Division, UCB, as of 11/1988 "scrlattri-3-12", 8-27-90, mn

Figure 1

FACTORS DETERMINING TIME TO DEGREE

Institutional and Field-Specific Factors

1	**Research Mode**	Apprenticeship Mode Team Work Laboratory	Individualistic Learning Solitariness Library
2	**Structure of Program**	No M A./M S required QE includes Dissertation Prospectus Annual Evaluation	M.A /M S. required QE does not include Dissertation Prospectus Sporadic Evaluations
3	**Dissertation Definition**	Test of Future Ability to do Research	Contribution to Knowledge (Book)
4	**Mentoring**	Faculty Mentoring Departmental Advising	Absence of Faculty Mentoring and Dept Advising
5	**Research Money**	Many Sources	Few Sources
6	**Type of Financial Support**	Research Assistantship Fellowships	Teaching Assistantship Loans Own Earnings
7	**Campus Facilities**		
	Housing	Affordable	Expensive
	Child-care	Available	Overcrowded
	Space	Available (Office, Meeting)	Overcrowded
	Transportation	Efficient, Affordable	Slow, Expensive
	Library	Long Hours, Year round	Short Summer Hours
7	**Job Market** Post-doc Academic Industry	Many Openings Well-paid	Few Openings Medium or Low Salaries
		=	=
		SHORT TIME (LOW ATTRITION)	LONG TIME (HIGH ATTRITION)

Maresi Nerad, 7-27-1990, "src\model", mn

Figure 2

Doctoral Requirements UC Berkeley 1978-1988

Departments	1978 Requirements	1988 Changes in Program (Between 1979-88)	Years to degree	Median	N
Biochemistry	Masters not required Individualized research program with advisor (5 seminars) 1 foreign language proficiency exam. Must teach 2 quarters. Qualifying Exam at end of 2nd year. Dissertation developed w/advisor Dissertation.	4 seminars. Annual progress reviews Many new research methods No foreign language required	1980-84 1984-89	5.2 5 6	45 69
Electrical Engineering & Computer Science	Masters implicitly required. Major: 6 grad courses (indiv program w/advisor) 2 Minors: 3 grad courses each, 1 minor outside EECS. Prelims (oral) based on 4 courses taken all at once by 2nd year. No language requirement. Qualifying Exam taken by 3rd year includes dissertation Dissertation.	R.A. research may be used to fulfill some requirements. Prelims on 3 areas can be spread out (not taken at once). Additional Students must teach 1 semester	1980-84 1984-89	5.2 5 2	176 269
English	Masters not required. 12 courses, 5 comprehensive areas. Field exams Proficiency in 3 foreign languages or advanced knowledge in 1, proficiency in an additional language. Teaching not required, but is most common form of financial support Qualifying Exam (oral) taken after coursework (includes dissertation topic) Prospectus 25-40 pages, a "prima facie case" Dissertation	10 courses, 5 areas Deleted field exams, added coursework in Chaucer, Shakespeare. Prospectus 20-25 pages a "preliminary working paper"	1980-84 1984-89	8 9 8 6	55 73
History	Masters required 8 courses, 3 fields. Up to 4 languages, depending on field Teaching not required, but is most common form of financial support. Qualifying exam (oral) Prospectus after qualifying exam Dissertation	More strict about time to degree Must hand in prospectus at least 6 months after qualifying exam	1980-84 1984-89	9 4 8 6	76 87
Sociology	Masters required 11 courses 9 pre-M.A., 2 post-M.A. 3 courses may be advanced undergrad level or independent study (299). 5 papers. No formal language requirement, but committee may require. Teaching not required but is most common form of financial support Qualifying exam tutorials in 3 fields or orals in 4 fields Prospectus after qualifying Dissertation	Only graduate level coursework counts toward degree. 8 pre-M.A., 3 post-M.A. Theory & Methods course is now 4 units (more work).	1980-84 1984-89	9 7 9 2	55 73

Source Departmental Graduate Handbooks and General Catalogs

N = Number of students

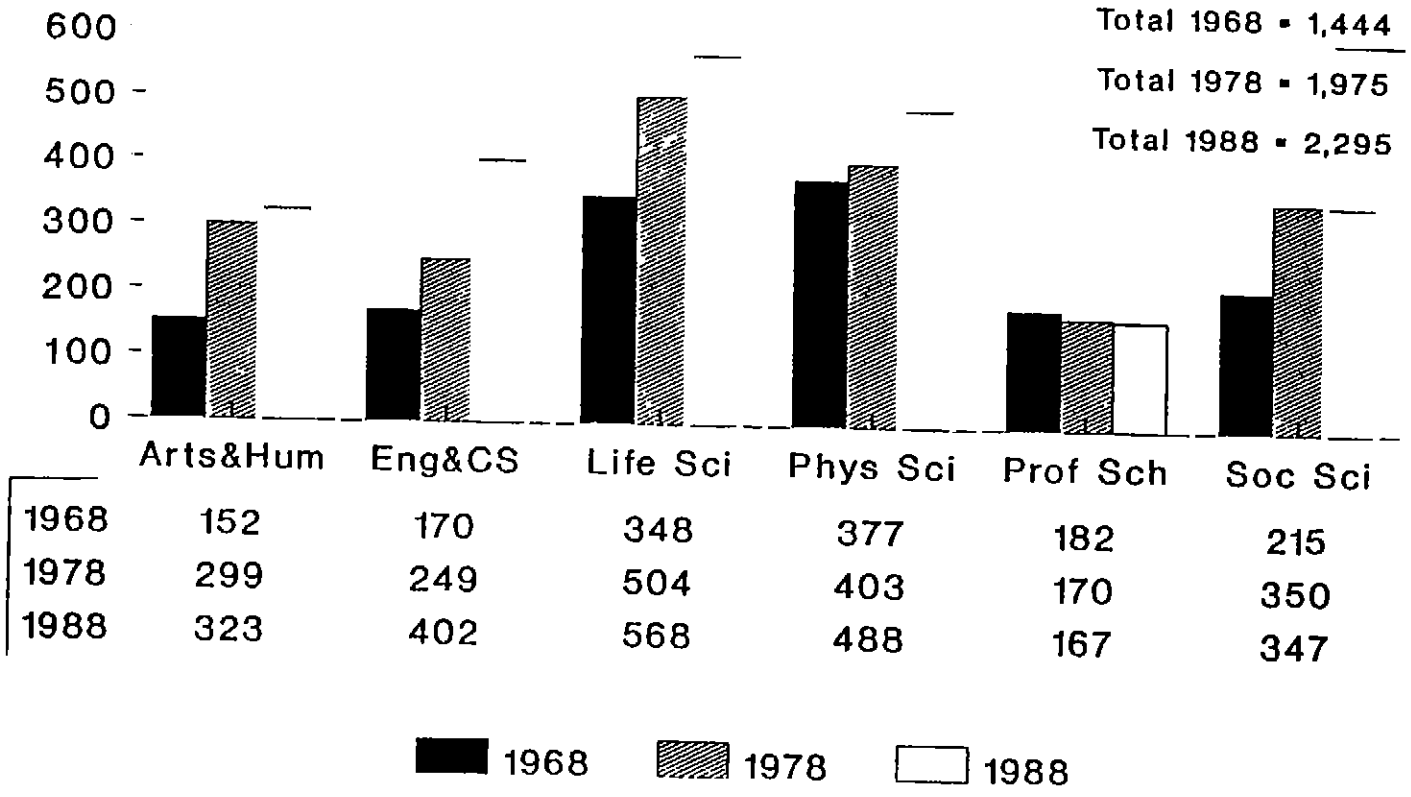
FIGURE 3

Doctoral Requirements 1989 90 UCSB, UCLA, UCI

Departments	UCSB	UCLA	UCI
Biochemistry	6 courses + 2 seminars per year for 3 years. 1 language. Masters not required No teaching requirement	11 courses No language Masters not required 1 year teaching 3 written reports.	7 courses, 3 seminars No language Masters not required Teaching required Must be associated with labs of 3 different investigators Comprehensive exam, 2nd year then specific research project w/faculty
	2 Q.E.s both written research proposals + oral defense, taken by 3rd year (the 2nd Q.E is dissertation research prospectus) Dissertation. Oral Defense.	Q E. oral based on a research proposal by end of 2nd year Prospectus separate. Dissertation	Q E. by end of 3rd year is on proposed dissertation (prospectus). Dissertation.
EECS	Tailored program, no set courses No language. Masters not required No teaching requirement Specialty area + 2 separate tech. areas Prelims on areas. Q E. Prospectus. Dissertation. Final defense.	Program planned with adviser No language Masters not required No teaching requirement. No prelims specified Q.E. (does not specify) Dissertation	Must enroll in weekly dept seminar for 4 quarters No language. Masters not required Teaching required Must be accepted into research group during first quarter Prelims first year Q E. includes prospectus Dissertation Final defense.
English	12 courses 1-2 languages Masters required Comprehensive exam. Teaching not required Q E on 3 areas, 1 in dissertation field Prospectus Dissertation	9 courses, then "as many seminars as possible." 1-2 languages Masters required. 3 comprehensive exams Teaching not required but "strongly recommended" Q.E. on areas, includes prospectus. Dissertation Final defense.	2 years of full-time enrollment in graduate coursework. 2 languages. Masters not required 4 written exams Teaching not required Q E. Prospectus. Dissertation. Final defense optional.
History	9 courses. At least 1 language. Masters required Teaching required. Q E. 4 fields, 3 written, 1 oral Prospectus. Dissertation Final defense.	Courses to cover 4 fields, at least 1 continuous 2 3 quarter seminar 1-2 languages. Masters not required, but "substantial research paper" before Q.E. is required Teaching not required, but strongly recommended Q.E. by end of 9th quarter written exam on major field, oral on 4 fields, prospectus Dissertation.	4 required core courses/seminars/colloquia Language req not explicit Masters implicitly required Teaching required Q E. written and oral on 4 fields and prospectus. Dissertation Final defense.
Sociology	4 core courses. No language. Masters required. Teaching not required Prelims in 2 areas. Q.E. on prospectus. Dissertation Final defense	12 courses. 1 language. Masters required Teaching not required Q E. Prospectus Dissertation.	(Social Networks) Core coursework and individualized program 1 language. Masters not required Teaching not required Q.E. by end of 3rd year based on prospectus Dissertation Final defense

Source General catalogs (1989-90) for each institution

NUMBER OF DOCTORATE DEGREES AWARDED UNIVERSITYWIDE BY DISCIPLINE 1968, 1978, and 1988

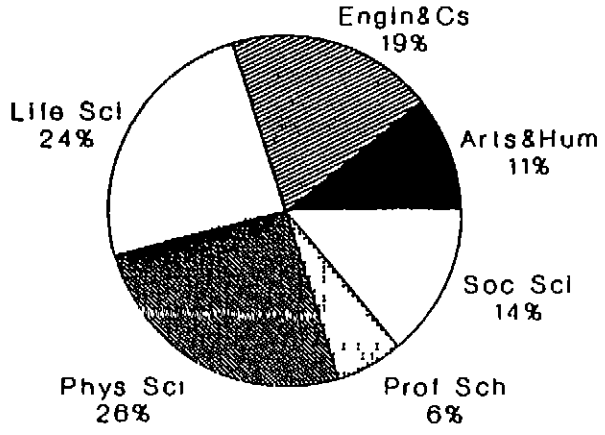


	Arts&Hum	Eng&CS	Life Sci	Phys Sci	Prof Sch	Soc Sci
1968	152	170	348	377	182	215
1978	299	249	504	403	170	350
1988	323	402	568	488	167	347

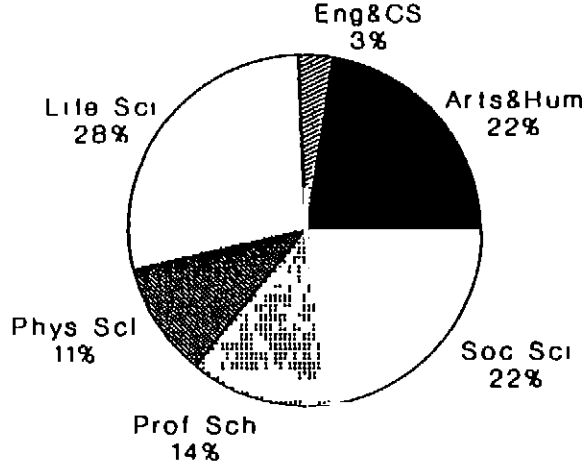
Source. National Research Council, SED

DISTRIBUTION OF DOCTORAL RECIPIENTS
BY DISCIPLINE
FOR DEGREES AWARDED 1980 TO 1988

Universitywide



MEN
(N = 13,039)



WOMEN
(N = 5,587)

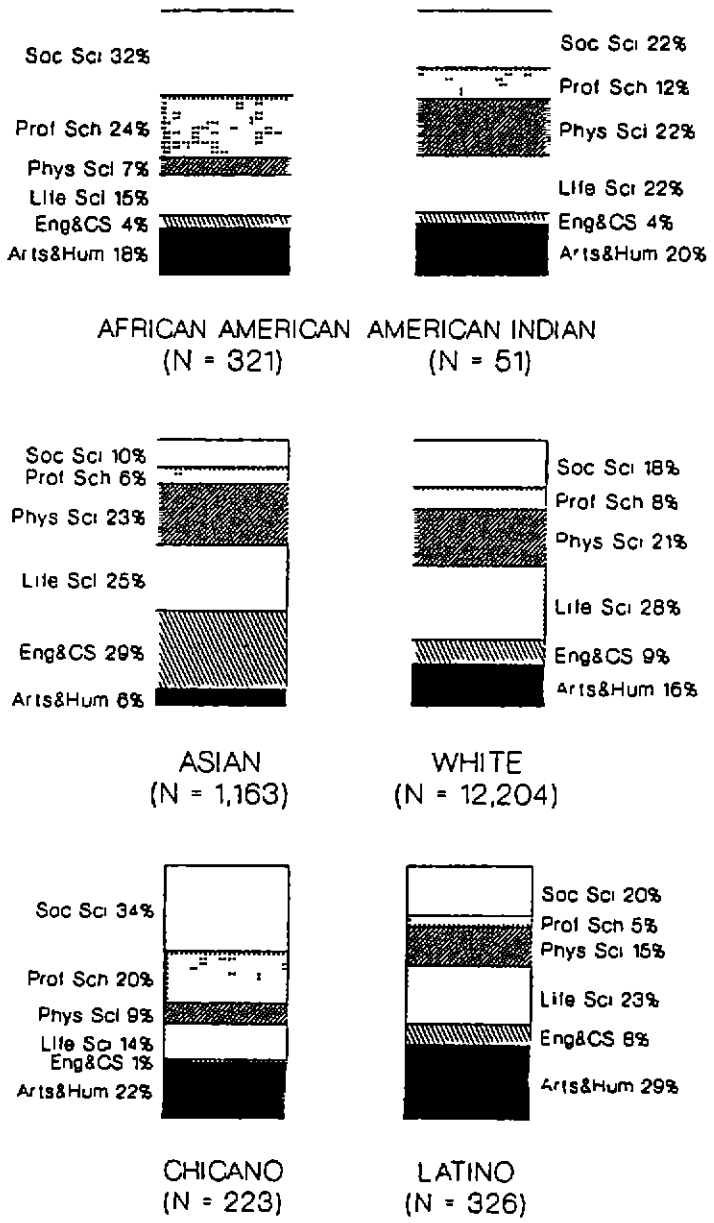
Source National Research Council, SED

GRAPH 3

DISTRIBUTION OF DOCTORAL RECIPIENTS BY DISCIPLINE FOR DEGREES AWARDED 1980 TO 1988

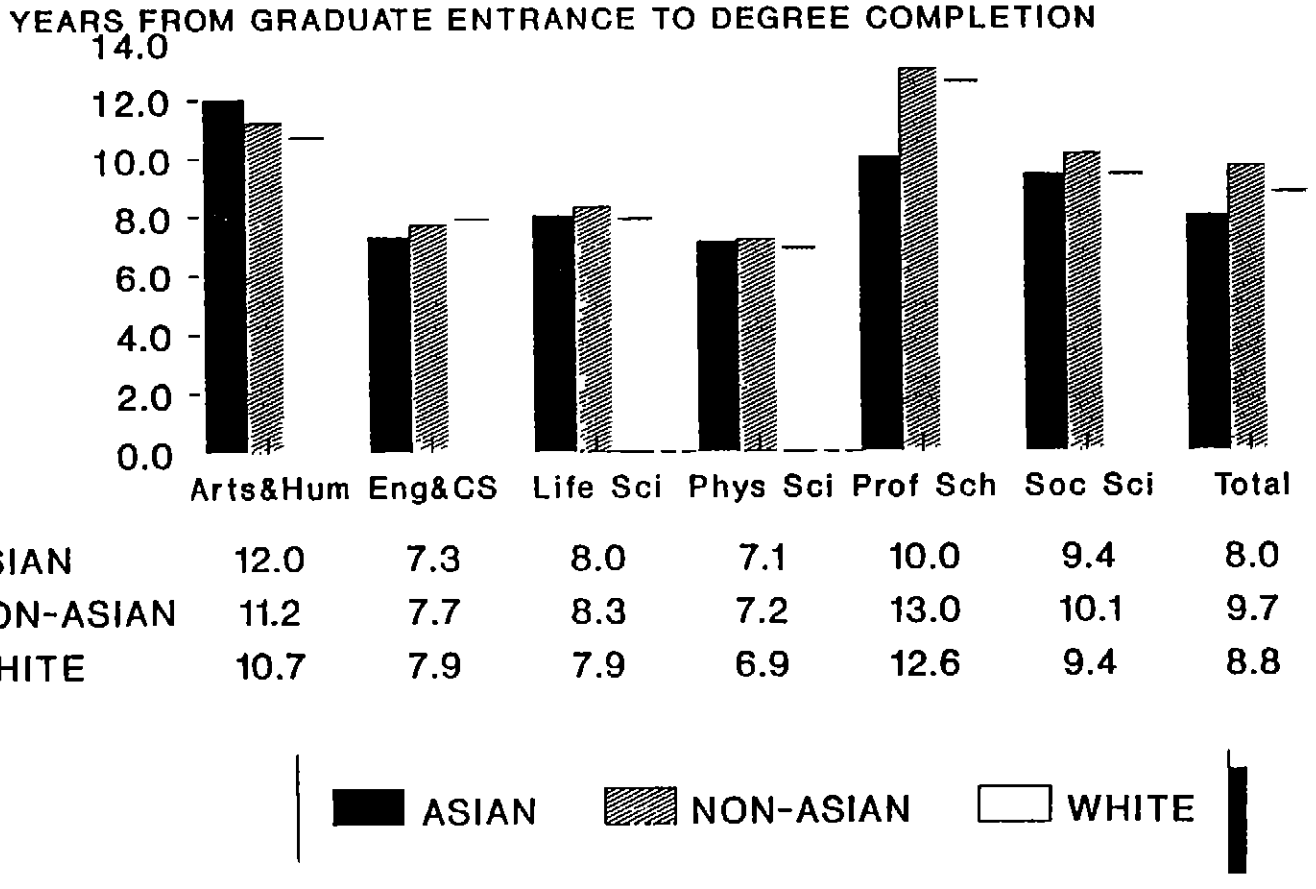
(U.S. Citizens & Permanent Residents)

UNIVERSITYWIDE



Source: National Research Council, SED

MEAN TIME TO DOCTORAL DEGREE, 1980-88
ASIANS/NON-ASIAN MINORITIES/WHITES
UNIVERSITYWIDE, BY DISCIPLINE

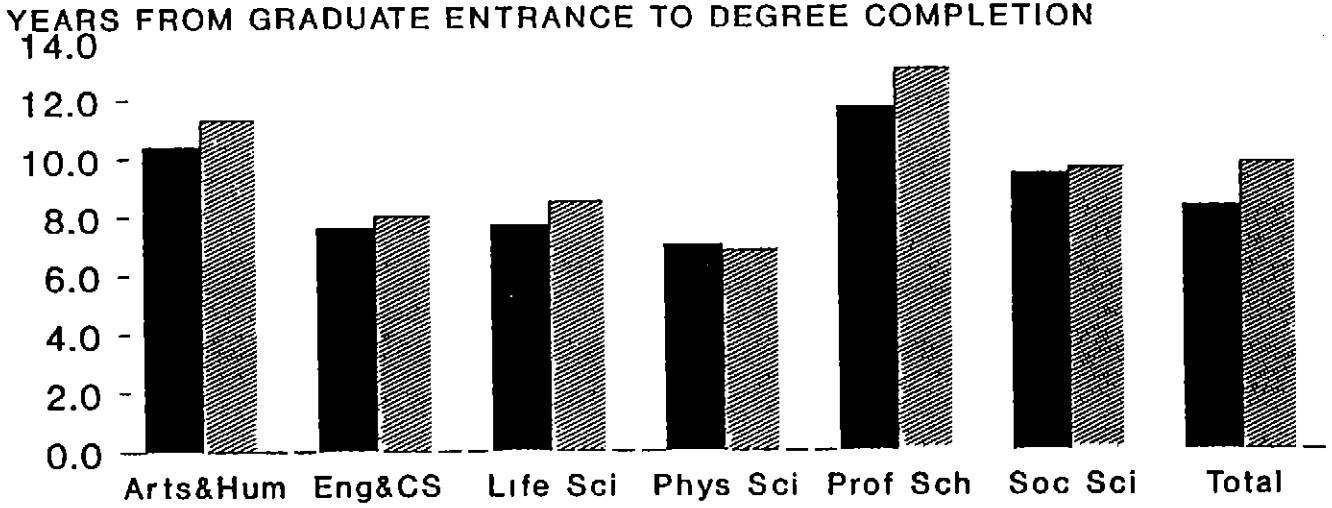


	Arts&Hum	Eng&CS	Life Sci	Phys Sci	Prof Sch	Soc Sci	Total
ASIAN	12.0	7.3	8.0	7.1	10.0	9.4	8.0
NON-ASIAN	11.2	7.7	8.3	7.2	13.0	10.1	9.7
WHITE	10.7	7.9	7.9	6.9	12.6	9.4	8.8

Source: National Research Council, SED

GRAPH 4

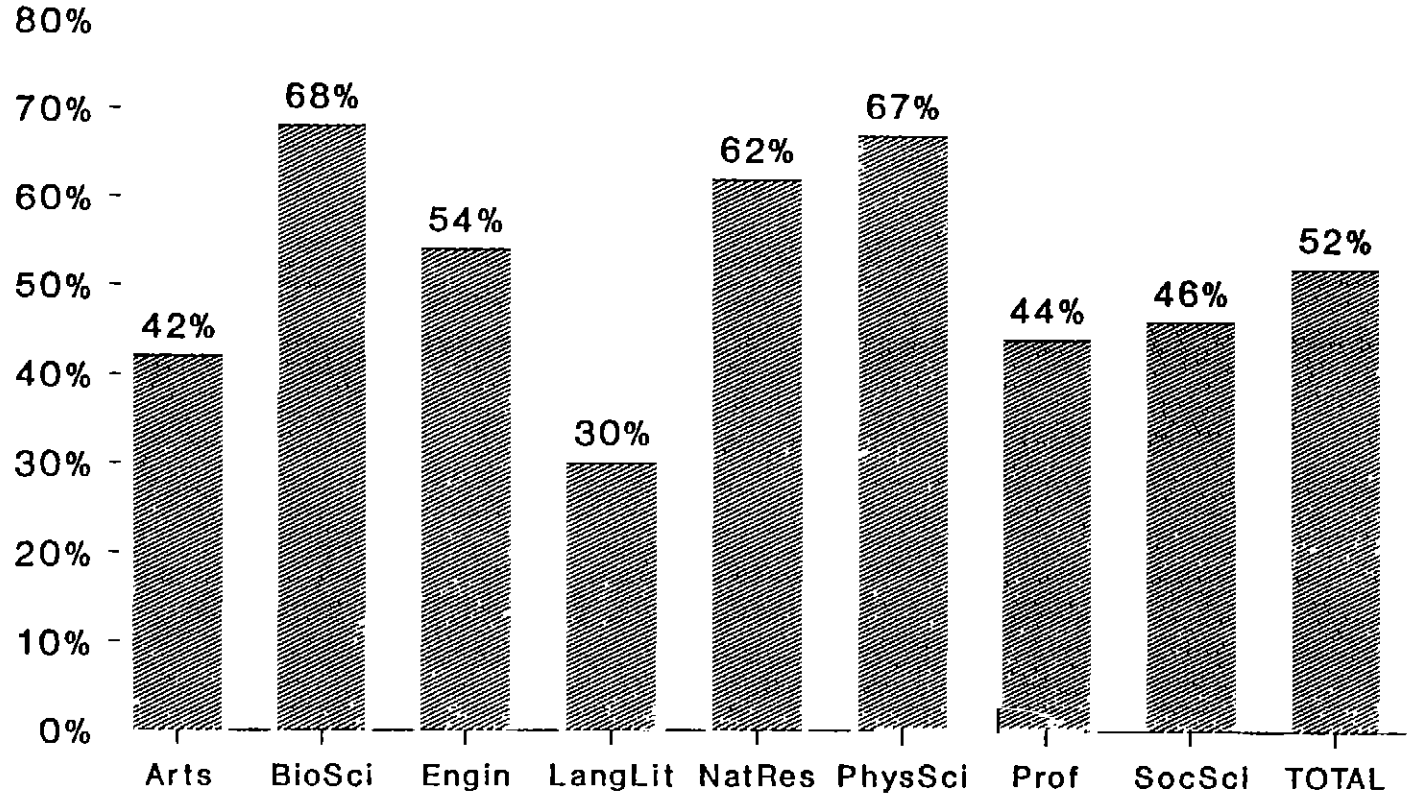
MEAN TIME TO DOCTORAL DEGREE, 1980-88
MEN/WOMEN BY DISCIPLINE
UNIVERSITYWIDE



	Arts&Hum	Eng&CS	Life Sci	Phys Sci	Prof Sch	Soc Sci	Total
MEN	10.4	7.6	7.7	7.0	11.7	9.4	8.3
WOMEN	11.3	8.0	8.5	6.8	13.0	9.6	9.8
TOTAL	10.8	7.6	7.9	6.9	12.3	9.5	8.7

Source: National Research Council, SED

Doctoral Completion Rates
1975-77 Cohort by Eight Fields of Study
As of November 1988



University of California at Berkeley

APPENDIX D

Senate Concurrent Resolution No. 66

RESOLUTION CHAPTER 174

Senate Concurrent Resolution No. 66—Relative to doctoral degrees issued by the University of California.

[Filed with Secretary of State September 21, 1989]

LEGISLATIVE COUNSEL'S DIGEST

SCR 66, Hart. California Postsecondary Education Commission: study of and recommendations regarding doctoral degrees issued by the University of California.

This measure would direct the California Postsecondary Education Commission to determine whether there has been an increase in time to completion of doctoral degrees awarded by the University of California, to study factors that have led or may lead to an increase in time to completion of doctorates, and to make recommendations, as specified.

This measure would require that the California Postsecondary Education Commission study and make recommendations regarding methods of increasing the number of minorities and women awarded doctoral degrees by the University of California, as specified.

WHEREAS, The State of California's public postsecondary education institutions exist to serve and educate all Californians; and

WHEREAS, Each year the racial-ethnic composition of the state's population becomes increasingly heterogeneous and the composition of student bodies of our universities becomes more diverse; and

WHEREAS, The nation's postsecondary education institutions are anticipating extensive faculty retirements by the year 2000, and

WHEREAS, As a result of the expected faculty retirements, California's public postsecondary education system anticipates needing at least 34,000 new postsecondary faculty, such that the University of California projects hiring at least 6,000 new faculty and the California State University projects hiring at least 8,000 new faculty; and

WHEREAS, This presents an opportunity to diversify the faculties of our postsecondary institutions by hiring more minority and women Ph. D.'s, who have been historically underrepresented; and

WHEREAS, It is the unique function of the University of California to grant doctoral degrees to those distinguished and qualified individuals who will comprise a significant portion of the new faculty applicant pool; and

WHEREAS, It is crucial that a substantial number of minorities and women have the opportunity to be awarded doctoral degrees in the next decade so that the postsecondary institutions of California

and the nation have a broad range of candidates from which to choose for the replenishment of faculty positions; and

WHEREAS, There have been recent reports indicating that the time to completion of doctoral degree programs has increased, such that students now take longer to earn doctorates; and

WHEREAS, The decreased rate of progress toward doctorates may signal coming shortages of teachers, scientists, and other professionals; now, therefore, be it

Resolved by the Senate of the State of California, the Assembly thereof concurring, That the Legislature hereby directs the California Postsecondary Education Commission to determine whether there has been an increase in time to completion of doctoral degrees awarded by the University of California, and to study the factors which have led or may lead to an increase in time to completion of doctorates, and to make specific recommendations relative to methods of increasing the rate of progress toward receiving doctoral degrees awarded by the University of California without compromising the integrity of the academic process, and be it further

Resolved, That the California Postsecondary Education Commission shall address in its study and recommendations at least each of the following areas:

(1) A comparison of doctoral programs to professional programs including an examination of the institutional and social changes affecting those programs.

(2) Increases in the financial burdens students face in earning doctorates and ways of reducing these financial pressures, including an examination of financial support packages and housing;

(3) Increases in the professional burdens students face in earning doctorates and ways of reducing these professional requirements, including an examination of teaching and research commitments and publication requirements necessary for career placement;

(4) Alternative methods of restructuring doctoral programs to streamline degree requirements and reduce time to completion of degree if found necessary, including, but not limited to, a study of any alternative methods being utilized by the University of California and other major research universities in the United States or elsewhere; and be it further

Resolved, That the California Postsecondary Education Commission shall also study and make specific recommendations relative to methods of increasing the number of minorities and women awarded doctoral degrees by the University of California and shall address in its study and recommendations at least each of the following areas:

(1) The recruitment of minorities and women into doctoral degree programs, including an examination of undergraduate preparation, academic research internships, and mentoring by faculty;

(2) The retention of minorities and women in doctoral degree programs, including an examination of degree requirements, financial support packages, teaching and research commitments, housing, length of time to completion of the degree program, counseling and advisement, and mentoring by faculty;

(3) The career placement of minorities and women awarded doctoral degrees, including an examination of the career placement within the University of California and the California State University; and be it further

Resolved, That no later than 12 months after the enactment of this resolution, the California Postsecondary Education Commission shall submit the results of its study, including specific recommendations, to the Legislature, the Regents, President, and Chancellors of the University of California, the Trustees, Chancellor, and Presidents of the California State University, the Board of Governors of the California Community Colleges, and to the governing bodies of the members of the Association of Independent California Colleges and Universities; and be it further

Resolved, That the Secretary of the Senate shall transmit a copy of this resolution to the California Postsecondary Education Commission, and the governing body for each segment of public higher education in California.

O

APPENDIX E

STATE OF CALIFORNIA
CALIFORNIA POSTSECONDARY EDUCATION COMMISSION
1020 TWELFTH STREET, THIRD FLOOR
SACRAMENTO, CALIFORNIA 95814-3985
(916) 445-7933

GEORGE DEUKMEJIAN, Governor

September 26, 1989

The Honorable Senator Hart
2057 State Capitol
Sacramento, California 95814

Dear Senator Hart:

RE: Senate Concurrent Resolution 66

We are pleased that the Legislature passed SCR 66 and are writing to promise a timely and productive effort on our part in responding to the legislation. In anticipation of the Legislature's approval of the resolution, we have held discussions on how to approach the study and wish to communicate to you the agreements between the California Postsecondary Education Commission and the University of California about our plan for responding to SCR 66.

The Commission will be responsible, by January of 1990, for gathering national data on the subject, including a profile of the average time to degree by discipline, stratified when possible by age, sex, and ethnicity. Other data and relevant research on factors influencing time to degree, including financial support available to students, academic counseling, curriculum and degree requirements, and job placement opportunities will be assembled. With this information, the Commission will assess to what extent increases in time to degree relate to increases in the financial burdens and in the professional burdens students face in earning doctorates. The Commission will also include any available information about strategies used in research institutions nationally to shorten time to the doctorate.

The University of California will be responsible for assembling parallel information on doctoral degree production, including time to degree and factors potentially influencing time to degree, within the University of California. In addition, the University will examine alternative methods of restructuring doctoral programs to streamline degree requirements, as well as other strategies that University faculty, staff and administrators might adopt in order to decrease time to degree and increase the recruitment, retention, and career placement of minorities and women.

The University report will be available to the Postsecondary Education Commission by August 1990 for Commission review and comment. At that time, the Commission and the University will collaborate to develop recommendations to be included in the final report to the Legislature, which will be transmitted by October 1990.

Please let us know if you have questions or comments about this plan.

Sincerely,

Bruce D. Hamlett
Director, Legislative Affairs
and Budget Analysis
California Postsecondary
Education Commission

Joyce Justus
Assistant Vice President
Education Relations
University of California

APPENDIX F

UC BERKELEY

DESCRIPTIONS OF SELECTED CAMPUS ACTIVITIES FOR THE PRE-GRADUATE MENTORSHIP PROGRAM

3. Multicultural Action Team - $98,306

This year I established the Multicultural Action Team with three Academic Coordinators who lecture in ethnic studies courses each semester (33%) and directly advise (67%) ethnic student groups with the intention of increasing retention and graduation rates of minority students on the Berkeley campus. We feel that the academic status of the the coordinators is unique and important to the overall mission. The method of accomplishing these goals is to address questions of cultural misunderstanding and to promote understanding and awareness of differences through a variety of programs and actions. These advisors help students to publish student publications, coordinate student-sponsored events which are academic or social in nature, help students create new communities for themselves, critique self-help efforts, act as a liaison between students and faculty or the administration, and provide a "safety net" for individual students in conflict. They also develop the Ethnic Student Agenda's budget requests which are submitted annually. MAT coordinates groups efforts with Student Activities and Services and the Women's Resource Center for good communication among various offices involved in different aspects of the programs. Specific ethnic groups are Asian, Black, and Chicano/Latino.

Some events in 1989-90 include the Asian Pacific Realities at Berkeley Conference, Chicana/Latina Retreat, African-American Students Leadership Retreat "Rebuilding Our Community," an event filled African-American History Month, and the development of a multicultural conflict course with Peace and Conflict Studies.

THE UC DAVIS WASHINGTON UNDERGRADUATE ACADEMIC MENTORSHIP PROGRAM

Director: Dr. Bruce Jentleson, Political Science

The Davis in D.C. program was funded for $5,000 to support underrepresented students in a pre-graduate experience to encourage the pursuit of graduate academic careers. Funds will support three students in the extended Fall Quarter beginning September, 1990.

DELTA SIGMA THETA

A contribution of $500 was given to the Delta Sigma Theta Sorority, a traditionally African-American sorority, to support a program encouraging these women to pursue graduate and professional school.

GRADUATE RECORD EXAMINATION WORKSHOP

Coordinator: Tammy Hoyer, Pre-Graduate School Advisor, Advising Services

Plans are currently being made to financially sponsor a GRE workshop in August for the MORE, MURALS, and SUAARP program participants. The workshop will address overcoming test anxiety, testing strategies, cultural bias, practice test taking and other techniques to assist students in successfully taking the examination. Estimated cost: $500

III. MINORITY SCHOLARS PROGRAM

Funding for this program was established at $31,780. The funds will support the following programs:

BIOLOGY UNDERGRADUATE SCHOLARS PROGRAM (BUSP)

Director: Dr. Merna Villarejo, Associate Dean, Biological Sciences
Coordinator: Deidre Sessoms (will be leaving in June)

BUSP is designed to introduce students to the many areas of biology. Students must enter the program in their freshmen year and take a core of curriculum designed to provide a solid foundation of courses to support upper division work in the biological sciences. In 1989, 50 students entered the program. Of those, 25 have continued into the second year. In 1990, 60 students entered the program. A funding base of $12,500 was provided to the BUSP program primarily to support the BUSP coordinator's position.

The Social Ecology Mentor-Mentee Program

Two years back, one of the most popular and successful Social Ecology mentors wrote an essay on his isolating experience as a young African-American first-year student at a largely white UCI. The numbing experience of cultural isolation, combined with the demands of college courses, forged a period of self-doubt and marginal academic performance, overcome mostly by the young man's perseverance. The situation by the time he was a mentor, and guide to six of his own students, was dramatically different: They were experiencing collegial relationships with students from similar backgrounds sharing common anxieties from orientation week forward. In addition, they were meeting face-to-face in small group interaction with three different faculty members while in their first year, a means to break down the impersonal setting of large, lower-division required courses. Unlike the Excellence Program, the Mentor-Mentee Program employs no academic selection criteria for mentees.

The mentor was one of six that year screened, chosen, and taught in a small seminar setting to address the academic and environmental adjustment issues of 30 mentees. (In 1989-1990, the sixth year of operation,there were 40 mentees) Mentors are selected on the basis of academic performance (3.0 minimum) and campus involvement. Their seminar fulfills the UCI upper division writing requirement, and covers materials on mentoring, peer counseling, higher education, and minorities in the American educational system.

The premises of our Mentor-Mentee program are simple, its cost minimal, and its results heartening. A mentor serves as a year round "buddy" for incoming SAA or EOP first-year and transfer students. The mentor's responsibilities include advising on: courses; use of UCI advising and academic support programs; study habits and time-management strategies; and administrative problems requiring the intervention of appropriate departmental, school, or campus officials. Perhaps the most critical role mentors play is responding to a host of personal adjustment issues for students who often are among the first in their family to attend college. Extracurricular activities are common at the small

group and combined group level, as are study groups. Last year we inaugurated an end-of-year off-campus retreat for mentors, mentees, and faculty sponsors.

While there is some natural overlap between the mentees and the participants in the Excellence Program, we are heartened by the high standing of students in each cohort and by the time-efficient and cost-effective method of early and personal intervention at the level of the individual student. While elements of self-selection can account for some of the Mentor-Mentee Program's success, minority student retention is an ultimate goal clearly well-served by this effort. Not all of the roughly 200 mentees who have ever been in this program are at graduation level yet, but initial indications are that this program has contributed to improved student retention rates in Social Ecology.

Expansion to other Academic Units

Neither of these programs are distinctive to the substantive areas represented within Social Ecology, nor are they reliant upon the unique demographics or personal attributes of its faculty. Both programs are suitable to Biological Science majors grappling with Organic Chemistry, or Humanities majors taking on the challenge of Humanities Core. The model of the Mentor/Mentee Program turns on the cultivation and support of a cadre of energetic upper-division mentors, and the successful recruitment of a group of mentees aware of the necessary adjustments to an academic setting more demanding than their high schools, community colleges or other prior schools. Faculty support is crucial, but hardly heroic; once operational, the system requires biweekly faculty supervision and occasional planning and assessment meetings throughout the year. Faculty sponsors have found their sessions rewarding. Faculty assist TAs in the preparation and development of homework materials, practice exercises, etc. and on occasion drop in and visit with discussion sections.

The Social Ecology undergraduate office has been a key element in the programs success. Much of their effort can be seen as investments in fine tuning the present system, which can now easily be borrowed by other schools and departments. With the use of a UCI Administrative Intern, the Mentor-Mentee Program cost is low (under $1000). Social Ecology uses 20-hour TAs for each Excellence course, so the fully built-out program this year will cost nearly $28,000. For one course, the figure is approximately $4,000. In 1990-91, a major thrust of the Office of the AVC-SAA will be the export of this model to other academic units. This process has already begun. Gary Evans and John Dombrink recently presented this model before a meeting of the UCI Council of Deans. Implementation will be achieved by engendering the cooperation of committed faculty in each unit. These faculty will be identified in the Undergraduate Research Fellows section of the Pregraduate Mentorship Program.

UCLA

In the College of Letters and Science, a total of $87,310 has been used in the current academic year to support the Minority Student Research Program (SRP). Of this sum, $60,000 went directly for student stipends, and $27,310 for staff support and publicity, the later category including advertisements in the Daily Bruin, flyers and direct mailings to potential participants in SRP. The Program supported 30 students in the winter and spring quarters -- the fall was spent organizing the Program -- with stipends of $1,000 a quarter. Participants were selected by a five-member committee who employed the following criteria: financial need, major, interest in research and graduate study and GPA. The program attracted over 120 applicants and the reports of satisfaction with SRP from participants and faculty mentors overseeing the individual research projects are very strong. Dean Edward Alpers, who runs the SRP within the College, would like to expand the Program next year depending on the availability of funds.

A second "pipeline" activity established within the College of Letters and Science this current academic year is the Graduate Mentor Program (GMP). The first step in the establishment of the program was the identification of large departments with the following characteristics: minority representation on the faculty, significant numbers of both minority undergraduate and graduate students and a strong departmental commitment to minority issues. Six departments -- Biology, English, History, Political Science, Sociology and Spanish -- were subsequently targeted for programmatic support as was the Graduate School of Education. The Mentorship Program involves the appointment of one or more graduate student mentors in the targeted departments who make themselves available to minority students for individual tutoring and counseling and who will organize study groups for particular courses and on disciplinary topics. Additionally, the graduate student mentors will work together with staff members in L and S to organize disciplinary workshops for undergraduate students which will feature informal, evening presentations by senior faculty members. The purpose of these workshops will be to inform minority students about the nature of advanced study in particular fields. A final element of GMP is the preparation, now underway, of a pamphlet on graduate education to be distributed to all students in the Academic Advancement Program. The total expense for GMP in the 1985-90 academic year, primarily for mentors' salaries, staff support, supplies, advertising and the publication of the brochure, are $75,982.

Finally, $50,000 has been allocated to the Graduate Division in support of its summer research program. This activity, which places undergraduates from UCLA, other UC campuses and institutions from around the country in a rigorous, eight-week program of research activity under close faculty supervision, has been in place for several years now and has been notably successful in both interesting minority undergraduates and in preparing them for graduate education. The $50,000 allocation will allow the Graduate Division to support 12 additional students in its summer program.

UCR

Increasing Interest in Graduate School Among Minority Students: GradTrack

1. GradTrack, housed in the Learning Center, is a cooperative effort of the Learning Center, Career Services, and the Graduate Division. It's purpose is to identify promising underrepresented minority undergraduate students and to encourage these students to consider graduate school. Started three years ago, the program was expanded this year to include a full-time coordinator, Frank Ramos, and additional activities.

2. **Activities**

All of the activities are designed to involve as many offices, departments, and faculty members as possible. Such a strategy not only makes the students aware of the resources available to them and serves to acquaint them with faculty, it also helps make the campus aware of the growing number of high-achieving minority students. Specific activities include the following:

2A. **Workshops**

Each year a variety of workshops are held with topics such as: introduction to graduate study, financing graduate work, graduate opportunities in education, preparing for graduate school by working with faculty, and so on. This year six workshops were conducted. In Fall Quarter, a total of 75 students attended. In Winter Quarter, 103 students came to the workshops. The workshops are open to the public, but we were gratified to see that over 50 percent of those attending were from our GradTrack lists. (No workshops were held in Spring Quarter).

2B. **Academic Year Internship**

In cooperation with the Graduate Division's Affirmative Action Program, a new internship for underrepresented minorities was instituted for Winter Quarter. The thinking behind this internship was to provide an opportunity for students to work

2B. Academic Year Internship (continued)

with faculty and do research during the academic year. Some students do not feel that they can devote a major part of their summer to research because they have family or financial needs to fulfill. It should be noted that funding for these interns was supplied from the operating budget, as the GradTrack budget is sufficient only to provide for the salary of the Coordinator.

With a modest amount of publicity, 36 students applied for the program. All 36 were from the target population and all but 4 had gpa's above 3.0. The Graduate Division contacted interested faculty members who reviewed the applications, and 8 were selected for the internships. The interns included majors from Anthropology, Administrative Studies, Biomedical Science, Biology, Computer Science, Political Science, and Sociology.

During the quarter, the Coordinator of GradTrack met with the interns and their cooperating faculty members and also requested a final statement to document that the interns had successfully completed their work.

2C. "New Directions" Undergraduate Research Conference

This idea was borrowed from San Diego which has held a conference to recognize the research writing conducted by undergraduates. At UC Riverside, we sent letters to all faculty members asking that they submit the names of students who had written outstanding papers. In addition, invitations to Inland Empire Universities were sent. We also asked faculty if they were interested in presiding at a session where students would discuss the impact of their papers and findings.

Planning is in the final stages for the conference which will be held May 18. Response for this new event has been good. 45 faculty have indicated that they would be interested in participating and 34 students have submitted papers.

2D. GRE Preparation Seminar for Summer Internship Program

This last summer, the Graduate Division asked us to provide a seminar to help prepare the undergraduate interns who were selected for the summer work. 30 students came to a series of seminars where they took two practice tests and received instruction in how to prepare for and take the GRE. The improvement from the beginning to when the students actually took the test was substantial.

UCSD 1989-1990 REPORT: PREGRADUATE MENTORSHIP AND UNDERGRADUATE MINORITY SCHOLARS PROGRAM

(I) THE PREGRADUATE MENTORSHIP PROGRAM

(A) THE UCSD FACULTY PRECEPTOR PROGRAM

UCSD has a number of academic enrichment programs that are designed to increase the number of women and minority students who seek a graduate or professional degree. Our newest program, the Faculty Preceptor Program, was inaugurated in the Fall 1989 quarter and is funded by the Pregraduate Mentorship funds from the Office of the President. The program serves Asian women and underrepresented minority freshmen and sophomores. Asian women were targeted for the Preceptor Seminar Program because they are the most underrepresented of all groups at the graduate school level.

The Faculty Preceptor Program has three specific goals:

- to expose academically promising Asian women and underrepresented minority freshmen and sophomores to exciting areas of faculty research in a small-group seminar setting;

- to provide a warm and supportive experience for minority students who often feel uncomfortable and wary as they begin their college careers on a largely white campus; and

- to introduce lower division students to the excitement of scholarly work, the research interests of the faculty, and the rigor of academic excellence.

Each Faculty Preceptor seminar was for two quarters, met for six one-hour and thirty minute sessions per quarter and was limited to a maximum of 10 students Students chose the preceptor and seminar they preferred; they were required to write a paper in the second quarter.

A total of 240 students enrolled in the Faculty Preceptor Program: 70 in the Fall 1989-Winter 1990 quarters, and 170 in the Winter 1989-Spring 1990 quarters. Thirty-one seminars were offered. Of the 31 seminars, 12 were in biology and pre-med, 11 were in the humanities and social sciences, and 8 were in chemistry, physics, engineering and computer science. The course titles of the 31 seminars are set forth in the Appendix.

Each of the 31 faculty preceptors were provided with a $ 1,500 grant from Pregraduate Mentorship funds that could be used for any professional, research or equipment needs. Thus, a total of $ 46,500 was spent on Faculty Preceptor Seminars An additional $4,600 was spent on various administrative costs, such as mailing cost, phone call, xeroxing, brochures, and welcome lunches and dinners for the students and faculty in the program.

Implementation of the program began with letters describing the new initiative that were sent to all UCSD faculty in the spring of 1989. The recruitment letter is included in the Appendix. Faculty were very supportive and many indicated that such a program was long overdue. A total of 31 faculty agreed to give a seminar, and many others indicated that they would consider doing so in the future.

Personalized letters inviting student participation, seminar brochures and enrollment instructions were sent to targeted freshman who were UC-eligible admits to UCSD. Later, sophomores were also recruited if they had a 2.8 GPA at UCSD. Recruitment had to begin during the late summer, before students arrived on campus. After the letters were sent, follow up phone calls were made by a group of approximately 15 top ranked minority students who were juniors or seniors. In the 1990-91 academic year, we will only offer Faculty Preceptor Seminars during the Winter-Spring quarters. This means we will recruit when the students on already on campus in the Fall quarter. A copy of the letter used to recruit the students in included in the Appendix.

UCSD's Office of Academic Enrichment designed and implemented the Faculty Preceptor Seminar Program. The Director of Academic Enrichment is Dr. Mary Freifeld who reports directly to the Vice-Chancellor for Undergraduate Affairs, Dr. Joseph Watson. The Office of Academic Enrichment was established in October 1988. It has been given the responsibility of designing, initiating, and administering programs to prepare women and minorities for graduate school.

In addition to the Faculty Preceptor Program, the Office of Academic Enrichment is currently responsible for UCSD's Annual Undergraduate Research Conference, UCSD participation in the Western Name Exchange, the academic year Faculty Mentor Program, and two federal grants that support summer research programs for undergraduates this year: The Ronald McNair Post-Baccaulaureate Achievement Program and the Minority Participation in Graduate Education Program.

The College of Letters and Science proposes to utilize these new funds in two specific programs: the Honors Opportunity Program and the Graduate Studies Preparation Program. EOP/SAA has also allocated an additional $54,267 in support of these two new programs in recognition of the number of minority undergraduates enrolled in the College of Letters and Science. The EOP/SAA funds will support the staff costs associated with the management of the two programs under the supervision of the Dean of Undergraduate Affairs of the College of Letters and Science and staff will be housed in the College's office.

The College of Letters and Science has also recently developed an Undergraduate Research Program which will be instrumental in the success of the new new initiatives aimed at minority and women undergraduates. The Honors Opportunity Program will provide opportunities for minority and women undergraduates whose GPA and SAT scores fall slightly below those normally required for admittance to the ongoing College Honors Program. Students will be nominated by faculty and selected by the Honors Advisory Committee. These students will be given Honors Status and will participate in special seminars designed to develop research skills. Key faculty and staff participate in the seminars and students will also be provided with funds related to their research interests.These honors students will also be provided with one-to-one faculty mentorships, will participate in the three-tier mentorship(GRMP) sponsored by the Graduate Division, will receive specialized academic and career advising, will have special access to the microcomputer labs, will be given guaranteed housing for those students who are selected to participate in this program with the option of housing in the the Community of Academic Pursuit (a special residence hall floor set aside for Honors students) will participate in collioquia, art showings, musical recitals and presentations of research at campus and national meetings, will have access to special honors opportunities within their department and major, will be provided

with scholarships to attend the GRE preparation workshops and will have their research published in an annual publication of undergraduate research.

The Graduate Studies Preparation Program is designed for those students who while not readily eligible for the Honors program show promise of becoming so by their academic record, their SAT's and letters of recommendation. The focus of this program is similar to the Honors Opportunity program, but is geared specifically to preparing the students to become eligible for the Honors program by assisting them through specialized advising, peer and faculty mentorships, and tutorials. Once the students' GPA is improved, and they are recommended by their faculty advisor they will be placed in the Honors Opportunity program as described above.

The College of Engineering's Minority Education Program (MEP) was recently rated first and most effective in the areas of recruitment, student performance (GPA) and graduation by a statewide assessment of the 17 Minority Education Programs in California. Based on the College's previous success in these areas, the new funds will be used to implement the Pregraduate Academic Advancement Program in Engineering. The new program will be housed in the College's Minority Affairs Office and will be managed by the staff under the supervision of the Assistant to the Dean for Minority Affairs. The program will also have a Pregraduate Academic Advisement Program Committee made up of faculty from the College's respective departments who will serve as advisors to the program. It is expected that 75% of the students who participate in the program will go on to graduate school, an ambitious goal given the national percentage of engineering undergraduates with bachelor's degrees who go directly into industry, based on the College's previous success with minority undergraduate placements into graduate programs.

UNIVERSITY OF CALIFORNIA, SANTA CRUZ
PREGRADUATE MENTORSHIP AND MINORITY SCHOLARS PROGRAM REPORT

INTRODUCTION

The University of California, Santa Cruz campus is critically concerned with the identification and preparation of underrepresented and low-income students for graduate study. This year our focus is in building post-baccalaureate achievement programs which will significantly increase placement of UCSC students in graduate programs at the doctoral level. Additionally, given the urgent need to increase and diversify the faculty pool for UC and universities nationally, our primary focus is on encouraging students to pursue academic careers.

The Pregraduate Mentorship and the Minority Scholars programs, with a grant from the Department of Education, have provided the financial support to expand Affirmative Action efforts in developing three new programs:

The Faculty Mentor Program
The Graduate Information Program
The Summer Opportunities for Academic Research Program

These programs will be discussed in this report, along with new ideas planned for the 1990-91 academic year.

NEW PROGRAM INITIATIVES

The **FACULTY MENTOR PROGRAM (FMP)** began operation during the Winter quarter of 1990 as a two quarter research experience for students in Humanities and Social Science disciplines. Twenty-five students, in junior standing, were selected as program participants. The recruitment and selection process specifically targeted students interested in pursuing graduate study at the Ph.D. level. Students received research training, attended workshops, and were matched with faculty mentors. This Spring quarter, students are involved in faculty projects as research assistants gaining hands-on research experience. In addition to the one-on-one research opportunities, students can also participate in a group research project sponsored by the Council on Race and Ethnicity. The Council involves fifteen UCSC faculty involved with research focused on race and ethnicity issues. A current research project activity involves the evaluation of the SAA/EOP Summer Bridge Program. The group project is under the direction of John Kitsuse, sociology faculty member, with support from two graduate students, Josie Mendez Negrete and Hal Aronson. The research training arm of the Council, the Institute for Undergraduate Student Training and Research (IUSTAR), has developed a research methods tutorial which assists students in preparing the evaluation design and protocol. The actual implementation of the evaluation will be conducted during the summer.

The **GRADUATE INFORMATION PROGRAM (GIP)** was developed as an outreach strategy targeted at all SAA/EOP students. This program includes the publication of a monthly informational bulletin on graduate opportunities and related information; the development of a graduate school and summer research/internship information bank (maintains current information and a[illegible]lications); and workshops on graduate education and opportunities. This particular effort involved the coordination of information and activities with Boards of Study, campus resources, and faculty. The GIP Bulletin was received with much excitement within the SAA/EOP community. The bulletin and

informa ion bank have been directly responsible for increasing the numbers of UCSC students who applied to research programs offered through the University of California and nationally. We are presently gathering data on the number of students accepted into summer research programs.

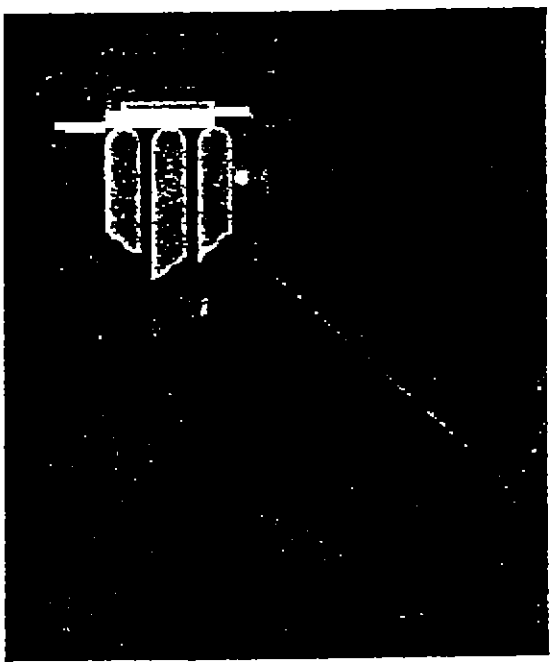
The SUMMER OPPORTUNITIES FOR ACADEMIC RESEARCH PROGRAM (SOAR) is funded through a grant from the Department of Educanon for the amount of $75,000. These funds will provide the financial support to sponsor twenty-two of the Faculty Mentor Program students to continue their academic research efforts during a six-week summer program (July 8-August 18). Students will participate in workshops designed to prepare them to apply to graduate programs, and preparation for the GRE exam. Research activity will be under the direct supervision of a UCSC faculty member who will also be involved with advising students on graduate school possibilities and processes.

APPENDIX G

REPORT OF THE

1990

ALL-UNIVERSITY FACULTY CONFERENCE ON GRADUATE STUDENT AND FACULTY AFFIRMATIVE ACTION



University of California

June 1990

ERSITY OF CALIFORNIA

BERKELEY • DAVIS • IRVINE • LOS ANGELES • RIVERSIDE • SAN DIEGO • SAN FRANCISCO

DAVID PIERPONT GARDNER
President

OFFICE OF THE PRESIDENT
300 Lakeside Drive
Oakland, California 94612-3550

June 1990

Dear Colleagues:

I am pleased to transmit the report of the Faculty Advisory Committee on the 1990 All-University Faculty Conference on Graduate Student and Faculty Affirmative Action, held from February 8-10, 1990, in Pala Mesa, California. More than 150 University of California faculty and administrators attended the meeting, the first All-University Faculty Conference since 1976.

The Conference was convened to consider how to improve the representation of minorities and women in the University's faculty and among its graduate student body. The Committee has proposed a series of recommendations which grew out of discussions among the participants and from presentations by the principal speakers--former Regent Vilma Martinez, Vice President Walter Massey of the University of Chicago, Director Uri Treisman of UC Berkeley, and myself.

I am moving forward on the recommendations addressed to the Office of the President and am seeking the resources UC needs to implement them, e.g., I have already committed, in concert with the Chancellors, $1,000,000 for the second year of funding an expanded program of graduate fellowships for women and minorities.

The Conference was characterized by lively and thoughtful discussion and by a clear commitment to the vision of a University community enriched by the talents of California's diverse population. I believe that you will find the Committee's report well worth your time.

Sincerely,

David Pierpont Gardner

1 9 9 0

ALL-UNIVERSITY FACULTY CONFERENCE

Office of the
Senior Vice President
Academic Affairs

June 1990

Dear Colleagues:

We have tried to summarize in this report the many ideas and recommendations that were put forward at the All-University Faculty Conference on Graduate Student and Faculty Affirmative Action. The ideas are not prioritized or evaluated in a quantitative way but are presented much as they were generated at the conference. Even so, several ideas emerged repeatedly during the conference, and these form the basis of the major recommendations.

In a report such as this, it is hard to recapture the spirit of the conference and the strength of its resolve to achieve diversity. We take this opportunity, therefore, to comment on the conference spirit which was extremely positive and left no doubt that if wishing for diversity could make it so - it would be so. However, the solution is not that simple, and we recognize that achieving diversity will require much effort, creative energy, resources, leadership, and a commitment to it by every member of the University community.

The success of the conference will be judged by its outcome - how well the momentum generated carries over to each campus and how effectively its many recommendations lead to action and success. As a first step, we hope that the conference report will receive widespread attention and will stimulate all who are touched by it to make a personal as well as institutional commitment to achieving the principal objectives, which are to ensure that the University of California be fully represented in its graduate students and faculty by minority citizens and women who will participate fully in the continued excellence of the University.

F.N. Spiess
Chair, Academic Council

Marjorie C. Caserio
Chair, Advisory Committee
for the Conference

University of California

All-University Faculty Conference Advisory Committee

Carlton Bovell
Chair, Department of Biology
University of California
Riverside, CA

Marjorie Caserio, Chair, Advisory Committee
Chair, Department of Chemistry
University of California
Irvine, CA

Richard W. Gable
Department of Political Science
University of California
Davis, CA

Sally J. Holbrook
Biological Sciences Department
University of California
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William M. Jackson
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Claudia Mitchell-Kernan
Dean, Graduate Division and
Vice Chancellor for Graduate Programs
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Raymund A. Paredes
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Karl S. Pister
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Department of Agricultural Economics
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Lu Jeu Sham
Physics Department
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Fred N Spiess
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SUMMARY

ON FEBRUARY 8-10, 1990, President David Pierpont Gardner convened representatives of the nine University of California campuses at the Pala Mesa Conference Center to address an issue of critical importance to the University and its future—the necessity to increase the diversity of the University's graduate student body and faculty. The University can serve society effectively only if it reflects the society it serves. The University has, therefore, a moral, social, and economic imperative to keep pace with the rapidly changing demographics of the state and provide access and educational excellence for an increasingly diverse population

The conference objectives were twofold (1) to consider ways in which the faculty could be further enlisted to improve the representation of minorities and women in the faculty and graduate student body; and (2) to realize concerted action to the challenge of achieving diversity in the faculty and graduate student body.

Discussion focused on four issues

- ☐ expanding the pool of minority and women graduate students,
- ☐ promoting affirmative action in graduate student recruitment and retention,
- ☐ promoting affirmative action in faculty recruitment, retention, and career advancement,
- ☐ creating campus and departmental environments that welcome and support women and minority students and faculty.

The need for a visible commitment to affirmative action and accountability for affirmative action at all levels of University governance emerged as goals of central importance Many action recommendations also emerged and are organized in this report at four levels· the Office of the President, campus administrations, academic departments, and faculty. Implicit in many of the recommendations is the understanding that, if implemented, they would be supported with necessary resources.

I. Recommendations for the Office of the President

1 Sponsor Universitywide meetings on affirmative action for faculty members by discipline, encourage the campuses to organize meetings to address affirmative action.

2. Establish systemwide mechanisms that enable individuals and groups, both faculty and administrators, to increase affirmative action efforts For example

- ☐ Provide multi-year financial support for graduate students, with attention to the specific needs of women and minority students
- ☐ Expand outreach activity with K-12 educational institutions to increase the pool of minority undergraduates
- ☐ Expand contacts with other institutions of higher education to increase the pool of qualified graduate students, particularly underrepresented students
- ☐ Establish a joint Administration/Academic Senate task force to examine the criteria for faculty advancement used by committees on academic personnel
- ☐ Develop a Universitywide information base regarding affirmative action efforts by academic departments on all UC campuses.

II. Recommendations for Campus Administrations

3. Sponsor campus meetings to educate and generate creative plans for affirmative action.

4. Create mechanisms to promote a campus environment that supports diversity. For example:

   - ☐ Establish workshops to develop sensitivity and leadership regarding affirmative action.
   - ☐ Provide funding to enable faculty to develop programs, special events, courses, or other creative projects to promote diversity.
   - ☐ Work to build a "critical mass" of minority and women faculty in all campus departments and programs

5. Support programs and strategies that increase the flow of talented women and members of minority groups into graduate programs and onto the faculty

   For example.

   - ☐ Improve and expand outreach efforts in K-12 school districts near each UC campus.
   - ☐ Expand efforts to provide talented undergraduates with information about graduate programs and assist with their transition to graduate school To this end, improved communication with other institutions of higher education is essential
   - ☐ Provide multi-year financial support for graduate students, and improve mechanisms for disseminating financial aid information.
   - ☐ Develop a basic faculty recruitment package, as well as postdoctoral fellowship awards, that enable the University to be competitive in recruiting women and minority candidates.

III. Recommendations for Academic Departments

6. Establish affirmative action plans and the mechanisms to achieve them

7. Develop recruitment and career advancement strategies for minority and women graduate students and faculty. For example

   - ☐ Develop recruitment strategies to improve diversity in departments and programs.
   - ☐ Develop career advancement strategies for women and minority students and faculty

8 Recognize and reward faculty who devote time and effort to promote affirmative action

9 Initiate or expand departmental collaboration and contacts with other institutions of higher education

IV. Recommendations for the Faculty

10 Assume greater responsibility for learning about affirmative action and for recruiting and mentoring women and minority graduate students and new faculty

11 Develop curricula responsive to society's increasing ethnic and cultural diversity.

12. Establish a joint Administration/Academic Senate task force to examine the criteria used by campus committees on academic personnel for faculty evaluations

13 Urge the Academic Senate to become a more active proponent of affirmative action goals

INTRODUCTION

"...this is 'The University of California'... the University of this State. It must be adapted to this people... to their peculiar geographical position, to the requirements of their new society and their undeveloped resources It is not the foundation...of private individuals. It is 'of the people and for the people'...in the highest and noblest relations to their intellectual and moral well-being....It opens the door of superior education TO ALL..."

—President Daniel Coit Gilman, Inaugural Address 1872

When President Daniel Coit Gilman called upon his colleagues to build a great university that "opens the door of superior education TO ALL," he enunciated a goal that has inspired the University of California for over a century The twin goals of access and excellence remain the lodestar that guides the University

Never has this vision been more challenging—and more imperative—than it is today

Our state and our nation are confronted by a mounting global challenge to their well-being National security now depends upon sustaining our competitive position in the world economy.

This new challenge to our viability, against a backdrop of exploding information and rapid technological change, demands that our educational system prepare a citizenry that will bring higher-level skills to the workplace, make informed decisions about increasingly complex issues, and reach out more effectively than ever before to the community of nations

If we are to maintain our position of leadership in the years ahead, we must fully develop our single most precious resource the talent and intellectual potential of our people

For the University of California, this crucial assignment has two components· maintaining excellence, while growing to meet the educational needs of the state's burgeoning population, and intensifying our efforts to ensure that our students, faculty, and educational programs incorporate and reflect the richness of our population's cultural and ethnic diversity

The need is urgent. By 2005, California's population is projected to grow by 22 percent—from 28 3 million to 34.5 million Between now and 2005 the K-12 population—the population from which we select our students—will grow at the rate of 50 percent—and the tenth grade population in California public high schools is projected to be 11 5 percent Asian, 10.1 percent Black/African American, 33.2 percent Hispanic, and 45 1 percent White (based on 1987 births). Thus, students who have been historically underserved by the educational system—Asian Americans, Blacks/African Americans, Chicanos, Latinos, Native Americans, and others—and who, for decades, have been characterized as a "minority" constituency, are fast becoming the majority of California's school age population

The future of the state and of the University depends upon increasing the opportunities for these students in higher education.

We are proud that our efforts over the past ten years to reach out to underrepresented minority students have met with considerable success at the undergraduate level The percentage of Black/African American, Hispanic, and Native American freshmen has doubled since 1980 to the current figure of 19 percent, and UC's five-year graduation rates for Blacks/African Americans and Hispanics are better than those of comparable public institutions Including Asian-Americans, one of every three UC students today is a member of a minority group. However, the imperative we face—to welcome to the University talented people who reflect

California in its full diversity and potential—requires new energy and a renewed commitment for the decade ahead In our graduate schools and faculty, especially, we must accelerate our progress in affirmative action for minority students and women of all backgrounds.

To address the need for concerted action to increase the diversity of the University's graduate student body and faculty, President David Pierpont Gardner, The Regents of the University, and faculty and academic administrators of the nine UC campuses convened at the Pala Mesa Conference Center on February 8-10, 1990, for the first All-University Faculty Conference in 14 years In opening the Conference, President Gardner asked,

> "What can we do—that we are not already doing—to address the differential rates at which students of various ethnic and racial backgrounds qualify for the University? . . How can we increase the percentage of minorities in our graduate and professional schools ? And what can be done to encourage a broader distribution of minority—and women—scholars among the various disciplines? . Are there things we can do to make academic fields more attractive? How can the faculty help? What are the contributions that faculty are especially qualified to make. .?"

This report summarizes the recommendations of the conference and highlights action plans for the Office of the President, campus administrations, academic departments, and the faculty.

While we focus herein on an expanded commitment and new approaches for the University of California, we hope that our findings and recommendations will be useful to others as they seek to meet similar challenges

"...the scale of California's population growth, combined with its expanding racial and cultural diversity, means that it cannot be coped with by a business-as-usual approach."

—excerpt from conference speech by David Pierpont Gardner

"We are, in short, confronted today with the two challenges we have always faced as a public university in a growing, diverse, and dynamic state—to serve California with the excellence that only a world-class university can provide; and to assure that our doors are open to the talent that California has drawn so abundantly, and perhaps never in greater measure than today."

—excerpt from conference speech by David Pierpont Gardner

CONFERENCE AGENDA

"...the scale of California's population growth, combined with its expanding racial and cultural diversity, means that it cannot be coped with by a business-as-usual approach."

—excerpt from conference speech by President David Pierpont Gardner

To prepare for the All-University Faculty Conference—the first such conference in 14 years—the Conference Advisory Committee commissioned papers addressing ethnic and gender diversity in higher education, the status of the University's affirmative action policies and programs, analyses of current problems, and proposals for possible solutions.

These papers, which were sent to all conference participants, provided the focus for the conference in four areas:

- ☐ expanding the pool of minority and women graduate students;
- ☐ promoting affirmative action in graduate student recruitment and retention,
- ☐ promoting affirmative action in faculty recruitment, retention, and career advancement, and
- ☐ creating campus and departmental environments that welcome and support women and minority students and faculty.[1]

In his opening address, President Gardner remarked:

"I believe that the times demand of us today a willingness to look at old issues with new eyes, to explore our traditions for the light they might cast on our future, and to plumb our options with an openness of mind and spirit characteristic of great universities everywhere. We are, in short, confronted today with the two challenges we have always faced as a public university in a growing, diverse, and dynamic state—to serve California with the excellence that only a world-class university can provide; and to assure that our doors are open to the talent that California has drawn so abundantly, and perhaps never in greater measure than today."

The challenge, the opportunity, and the achievement of diversity in higher education were the items which permeated the entire conference and which were reflected in the remarks of keynote speakers, Regent Vilma Martinez, Dr. Uri Treisman[2], and Professor Walter Massey[3], each of whom provided independent perspectives on affirmative action needs in higher education.

Regent Martinez expressed the key point, "...if the goal of this great University is excellence, and it is and should be, the attainment of that excellence requires diversity as a fundamental element. Anything less is mere pretension."

Conference participants addressed a spectrum of affirmative action issues in plenary sessions and in small discussion groups, seeking not only to identify problems but also to formulate recommendations for University action on three essential questions:

- ■ What must we do to find the talented people we seek?
- ■ How do we get them into the University's graduate programs and faculty?
- ■ How do we ensure their success?

[1] Reference copies of background papers commissioned for the conference have been sent to the libraries on each of the UC Campuses. Their titles and authors are appended to this report.

[2] Director of the Charles A. Dana Center at Berkeley, currently on leave as Eugene M. Lang Visiting Professor of Mathematics and Social Change at Swarthmore College.

[3] Professor of Physics, University of Chicago, and Vice President for Research and for the Argonne National Laboratory.

"...if the goal of this great University is excellence, and it is and should be, the attainment of that excellence requires diversity as a fundamental element. Anything less is mere pretension."

—excerpt from conference speech by Vilma Martinez

The recommendations that emerged speak to the systematic development of an infrastructure that encompasses every level of the University—from the Office of the President to individual faculty members—and supports the goal of increased diversity in all its aspects through multi-level accountability for affirmative action efforts, greater faculty awareness and involvement, curriculum development, increased participation in elementary and secondary education, more cooperation with other postsecondary institutions, and improved recruitment and retention. The recommendations and their accompanying action agendas appear in the sections below.

A persistent theme emerging from the conference is that the University's commitment to affirmative action must be emphasized at all administrative levels, from the President to department chairs. More than hollow statements are needed. The call is for goals, action, and accountability.

In light of the dramatic growth and change in California's population, individuals at all levels of the University need to be aware that the achievement of student and faculty diversity is crucial to the success of the University's mission as the leading California public institution in graduate education and to its continued national and international prominence in higher education.

RECOMMENDATIONS

Certain recommendations are of such central importance and apply to every level of University governance that they must be restated. There must be a firm commitment to affirmative action throughout the University. It must be recognized as a moral, social, and economic imperative for *everyone.* Diversity must be seen as an objective too important to delegate or ignore. Every member of the University community, from the faculty to the President, has a role to play in the achievement of diversity.

In other words, if the University is to succeed in becoming as diverse as the population it serves, then all levels of University governance (the Office of the President, the Chancellors, deans, department chairs, and the Academic Senate) must be accountable for affirmative action. Setting realistic affirmative action goals is a first step, but accountability at *all* levels of responsibility is a requirement for success Mechanisms that establish accountability are a matter for the University to consider at each level of responsibility.

Of great importance to the implementation of the various recommendations in this report will be the provision of adequate resources Some of the ideas presented would not require new or additional funding—but many do, and these will surely not be successful without adequate support. The resource issue was not one that was considered in depth at the conference; it did not influence the flow of ideas leading to the recommendations presented here. Notwithstanding, it must be said that affirmative action objectives are meaningless without a commitment of funds to help achieve them. We trust that the ideas flowing from the conference will stimulate wider thought and evaluation and will result in implementation and funding of programs judged most likely to be successful.

I. Action by the Office of the President

The Office of the President can play a central role in fostering diversity on the University's nine campuses. Among other activities, it can develop an institutional infrastructure for affirmative action activities, gather and disseminate information about affirmative action, support increased University participation in K-12 education, expand collaborative efforts with other institutions and organizations, increase financial support for graduate students, and provide leadership in examining faculty evaluation norms to ensure that these norms adequately support and reward faculty participation in affirmative action efforts.

Recommendation One:
Sponsor Universitywide meetings on affirmative action for faculty members by discipline; encourage the campuses to organize meetings to address affirmative action.

The Office of the President can foster an institutional climate conducive to affirmative action by sponsoring meetings similar to the All-University Faculty Conference for faculty by academic discipline. Such meetings would promote intercampus communication about affirmative action activities and provide a forum for sharing information about successful strategies for the recruitment, retention, and career development of women and minority students and faculty.

The Office of the President should encourage each campus to sponsor meetings of its senior academic administrators, Academic Senate officers, and department chairs to address issues of gender and ethnic diversity. In this way, the Office of the President can signal its commitment to diversity and establish the means for interdepartmental networking and communication about affirmative action strategies related to recruitment, retention, and career advancement

"One can make a great deal of difference by doing things at the local level...For example, if each department in every Ph.D. granting university in the country would commit itself to graduate one more minority Ph.D. student...than they graduated over the past decade it would make a significant difference."

—excerpt from conference speech by Walter E. Massey

Recommendation Two:
Establish systemwide mechanisms that enable individuals and groups, both faculty and administrators, to increase affirmative action efforts.

The Office of the President can support development of an institutional infrastructure for affirmative action activities in several ways. For example, it can work with the Chancellors to expand campus-based programs that have demonstrated records of success (e.g., by generating more support for MESA's K-12 programs and for its Minority Engineering Programs; by developing the resources to expand such programs to other fields of study). It can provide "in kind" support (e.g., waiver of overhead on grants, faculty release time) to leverage federal funds now increasingly available for programs to recruit and retain women and underrepresented minorities.

Recommended Action:

- Provide multi-year financial support for graduate students, with attention to the specific needs of women and minority students.

As a high priority, the University must increase multi-year or long-term financial support for graduate students and develop individualized financial support packages to meet the specific needs of women and minority graduate students on the various campuses In this context, "long-term financial support" means assurance of adequate financial backing for the period necessary to obtain the degree. Too often, support cannot be assured for periods longer than one year. Many minority students are deterred from undertaking graduate study for financial reasons. The University can move significantly to increase the flow of minority students into graduate school—and ultimately, into faculty positions—by ensuring that these students receive adequate financial support, including fellowships in the first year or two of graduate school and research and teaching assistantships in subsequent years.

To encourage undergraduate minority and women students to pursue graduate careers, the University must do a better job of publicizing information about the availability of financial support for graduate study. At a minimum, students

need to be informed that both financial aid and paid work are available throughout their graduate careers, as long as they remain in good academic standing.

The University should also consider establishing loan forgiveness programs. Many students are deterred from attending graduate school because of education-related debts that they have already incurred. To address this problem, the University could create programs that would "forgive" these loans for students who continue on for graduate study, especially in doctoral programs and professional fields in which minorities and women are severely underrepresented

- **Expand outreach activities with K-12 educational institutions to increase the pool of minority undergraduates.**

The University must increase its collaboration with other educational institutions to enlarge the pool of talented minority students and women who may eventually become University of California undergraduates, graduate students, and faculty members

The Office of the President can promote broader collaboration with elementary and secondary institutions through greater support and expansion of the outreach efforts it sponsors Although much of the organizational work and on-site activity in these efforts is the responsibility of campus-based personnel, the Office of the President can make a significant contribution by providing financial and administrative support for these activities

For example, it can support the expansion of current programs and the creation of new programs that help students make the transition from secondary school to the University (e.g., summer bridge programs). It can also encourage the development of programs which bring K-12 students and their parents together in academic activities that expose them to the world of postsecondary education

To help ensure that socioeconomic status is not a barrier to educational achievement, the Office of the President should target students from low socioeconomic backgrounds and encourage their participation in K-12 academic enrichment programs

In a related activity, the Office of the President could sponsor the development of media materials for minority communities that would promote the rewards of postsecondary education and academic careers. It is a mistake to assume that this information will automatically filter to the community without our efforts to ensure that it does

- **Expand contacts with other institutions of higher education to increase the pool of qualified graduate students, particularly underrepresented students.**

An important responsibility of the Office of the President is to promote more active collaboration with California community colleges, the California State University (CSU), and other postsecondary institutions across the state and nation

First, it should provide continued administrative and financial support for efforts designed to enable community college students to transfer to the University and to encourage students in the CSU system to pursue advanced degrees.

Second, it should encourage and enable faculty to improve connections with their colleagues at other institutions of higher education Such support would advance the inter-institutional networking that is essential for improving the transfer process and for facilitating more systematic recruitment of graduate students from the CSU system and from colleges throughout the nation that enroll large numbers of minority students (such as historically Black/African American institutions)

- **Establish a joint Administration/ Academic Senate task force to examine the criteria for faculty advancement used by committees on academic personnel.**

In cooperation with the Academic Senate, the Office of the President should play a key role in re-examining the criteria by which faculty are evaluated to ensure that these criteria adequately encompass and reward activities that support the broadening definition of the University's public service mission.

The Office of the President and the Academic Senate should establish a Task Force to review the faculty advancement structure and examine how best to ensure that a faculty member's contribution to affirmative action is given serious consideration

"The time has come—it's a matter of survival—when we have to play some role in strengthening K-12 education."

—excerpt from conference speech by Uri Treisman

"If faculty are going to work with minority students it has to be part of our professional work. This means it has to be a sanctioned activity of departments."

—excerpt from conference speech by Uri Treisman

in merit and promotion reviews (see "Faculty Action" Recommendation Twelve).

Faculty members are evaluated and promoted based on the quality of their contribution to teaching, research, and public service. The Task Force might assess whether it is possible and appropriate to evaluate the quality of affirmative action efforts within these three traditional categories or whether an additional category is needed.

By providing leadership in the examination of faculty evaluation norms, the Office of the President will make a significant first step toward empowering faculty to undertake affirmative action efforts (e.g., participating in activities involving K-12 institutions, collaborating with colleagues in other postsecondary institutions, serving as mentors to women or minority graduate students or new faculty members).

If faculty members know that the quality of their contributions to affirmative action will be seriously assessed and appropriately rewarded, they will have an incentive to undertake such activities. The creation of such an institutional incentive will have broad implications for the achievement of diversity throughout the University. For example, women and minority faculty members are often disproportionately involved in advising and serving as mentors to women and minority students, insuring that such activities will be evaluated and recognized in the personnel process will have a positive impact on women and minority faculty retention.

- Develop a Universitywide information base regarding affirmative action efforts by academic departments on all UC campuses.

The Office of the President should create a Universitywide data base to enable UC campuses, academic departments, and professional schools to compare and share information about affirmative action efforts and strategies.

By gathering and sharing information on a Universitywide basis, the University will be better able to identify potential graduate student and faculty candidates and to disseminate this information to appropriate departments at all UC campuses. It would be able to track minority and women faculty candidates and recruited faculty and to conduct exit interviews for those not retained,

thus providing the University with an instrument for self-evaluation Ideally, it should develop a nationwide data base of potential students and faculty.

The Office of the President should also establish a communications program for conveying information about student and faculty diversity. This program could include media presentations about the state's increasingly diverse population and the University's response to it, as well as about affirmative action and diversity at UC. The presentations could convey this crucial information to targeted audiences within the University community. For example, the University could develop materials to inform faculty members about ethnic and gender diversity as it affects their own departments and disciplines, or materials to inform minority and women undergraduates about career opportunities

II. Action by Campus Administrations

Campus administrators can support and encourage affirmative action efforts by reiterating their commitment to diversity in their statements to the campus community and by exercising leadership to demonstrate clearly that diversifying the student body and the faculty is central to the mission of the campus and the University Strategies that have been successful at other institutions should be of special interest to UC campuses The American Council on Education has published a particularly thoughtful handbook for enhancing diversity This handbook, called "Minorities on Campus," captures and distills strategies for diversity that have worked. It deserves careful attention.

Measures to advance affirmative action include developing better recruitment strategies for women and minority students and faculty, fostering faculty sensitivity about working with minority and women students, collaborating with other educational institutions at the K-12 and postsecondary levels, and developing financial aid resources

Recommendation Three: Sponsor campus meetings to educate and generate creative plans for affirmative action.

An effective way to increase affirmative action activity on the campuses is to replicate the All-University Conference at each campus. Such

"The most important factor listed by (minority) students at successful institutions was a supportive environment: the presence of mentors, study groups, science and math clubs, good advising and remedial courses when needed."

—excerpt from conference speech by Walter E Massey

meetings, by stimulating face-to-face contact and discussion among administrators and faculty, would call attention to affirmative action issues and generate ideas for action appropriate to the milieu of each campus.

Recommendation Four: Create mechanisms to promote a campus environment that supports diversity.

Many minority students experience a profound sense of alienation in their encounters with the University's traditional culture. It is the responsibility of campus administrators to take measures to affect the attitudes of faculty, students, and staff and to cultivate a sense of belonging among the diverse students attending each campus

Chancellors should continue to engage the support of the campus leadership in affirmative action efforts. For example, the selection process for vice chancellors, deans, and other administrators should include an assessment of each candidate's commitment to ethnic, cultural, and gender diversity Performance evaluations should consider achievement in affirmative action efforts

Recommended Action:

- Establish workshops to develop sensitivity and leadership regarding affirmative action.

Campuses should develop ongoing training workshops focusing on the role of senior administrators, deans, and department chairs in promoting student and faculty diversity. These workshops should sensitize campus leaders about the way in which their values affect affirmative action efforts in their respective units. The workshops should also serve to counter stereotypes about women and underrepresented minorities.

- Provide funding to enable faculty to develop programs, special events, courses, or other creative projects to promote diversity.

Successful programs require a combination of good ideas, human resources, and financial resources They are interdependent and indispensable. Faculty can do much to enhance diversity, but to stimulate ideas for creative affirmative action projects and to implement them, adequate resources must be available. Serious consideration should be given to the creation of a "diversity fund" to be used to fund projects based on faculty-generated proposals on affirmative action.

- Work to build a "critical mass" of minority and women faculty in all campus departments and programs.

The campus administration should continue to sensitize the entire faculty about the goal of diversity in faculty recruitment and retention. Because of the critical need to develop a diverse pool of talented graduate students from which future faculty members can be drawn, activities to advise women and minority students and to act as their mentors should be recognized as a particularly significant contribution to the University. Administrators should work with the academic departments to develop incentives for faculty members to undertake these activities.

Administrators can also establish ways to ensure departmental accountability for affirmative action and to encourage the development of affirmative action plans by academic departments (see "Action by Academic Departments," below) They can develop mechanisms for administrative oversight of affirmative action efforts and put in place incentives for departments to undertake such activities Additionally, campus leadership should, in cooperation with the Office of the President, participate in developing a data base for on-campus and intercampus comparisons of departmental effort related to affirmative action

Recommendation Five: Support programs and strategies that increase the flow of talented women and members of minority groups into graduate programs and onto the faculties.

Expanding the pool of talented women and minority students at every educational level is crucially important to the affirmative action goals of the University To achieve this end, campus administrators should foster and support programs and strategies that enrich the educational opportunities for historically underrepresented students throughout the educational system This entails more extensive contacts with K-12 institutions and

postsecondary institutions throughout the state and nation.

Recommended Action:

- **Improve and expand outreach efforts in K-12 school districts near each UC campus.**

Efforts to increase the flow of women and minority students into graduate school and ultimately into the faculty must begin at the K-12 level. The University already has many outreach programs in place on the campuses However, these programs are seldom tied to academic programs or departments. Senior campus administrators should ensure that these programs are brought within the mainstream of campus academic activity.

In concert with the Office of the President, campuses should create new programs and improve and expand existing bridge programs (both those designed for academic enrichment and those designed for recruitment) that introduce underrepresented K-12 students to the opportunities open to college graduates. Among other activities, campus leaders could work to

- establish and expand bridge programs with greater faculty involvement,
- establish and expand programs bringing K-12 students and parents together in academically oriented programs on campus, and
- establish programs that introduce talented high school students to the work of UC academic departments.

- **Expand efforts to provide talented undergraduates with information about graduate programs and assist with their transition to graduate school. To this end, improved communication with other institutions of higher education is essential.**

Campuses could also develop programs to prepare individuals for admission to graduate school. The agenda might involve, for example, creating and supporting bridge programs at the postbaccalaureate level and reviewing campus policies that would permit re-entry persons (e.g., UC employees) to pursue graduate studies

One-year transitional programs for post-baccalaureate, pre-graduate students represent a potentially fruitful way to increase the flow of minority and women students into graduate school Such programs might involve directed coursework during a transitional year between the undergraduate and graduate levels, financial aid arrangements for students in this transitional, pre-graduate status, and departmental acceptance and incorporation of students in this transitional status. Campus administrators would need to work closely with academic departments and the faculty to implement such programs.

Campus administrators can also play a more prominent role in improving collaborative efforts with community colleges, the CSU system, and colleges that have historically served large numbers of minority students. They could promote more consistent and sustained contact with administrators at those institutions, with the ultimate intent of improving inter-institutional faculty connections, facilitating transfers from community colleges, and cooperating in efforts to encourage more women and minority students to seek graduate degrees and consider academic careers

- **Provide multi-year financial support for graduate students, and improve mechanisms for disseminating financial aid information.**

Individualized financial support packages for graduate students should be a fundamental tool of departmental recruiting efforts Campus administrations, working with the Office of the President, can be instrumental in developing such packages Administrators should also ensure that their campuses provide clear, accurate information about financial aid for graduate programs to all students, especially women and minority students For those students from economically disadvantaged backgrounds, loan forgiveness programs are an additional means for removing economic barriers to participation in graduate programs

- **Develop a basic faculty recruitment package, as well as postdoctoral fellowship awards, that enable the University to be competitive in recruiting women and minority candidates.**

Campuses should formulate a basic recruitment package designed to reach *all* faculty but which takes into account the special needs of women and minority candidates. Such a package might include, for example, provisions for spousal employment and child care, as well as start-up funding for research or other logistical support for becoming established as a faculty member.

To improve UC's competitive position for recruiting women and minorities, campuses should consider establishing for women and minority candidates postdoctoral fellowships leading to ladder-rank faculty appointments. Recipients of these postdoctoral fellowships would receive research titles, until such time as they assume faculty positions.

"If departments are expected to play a mentoring role for minority students how will departments be evaluated? What kinds of incentives will go to departments for playing these roles?"

—excerpt from conference speech by Uri Treisman

III. Action by Academic Departments

Affirmative action must be firmly rooted in the academic departments of the nine University of California campuses Selection of graduate students, fellowship offers, faculty recruitment, and career advancement initiatives all take place in the context of individual departments and schools Academic deans and department chairs play a central role in developing and implementing affirmative action strategies and ensuring that minority and women graduate students and faculty are included in the activities of the departments

Academic departments should provide a faculty mentor for each new faculty member—minority and non-minority, tenured and untenured—to promote early socialization into the culture of the department and discipline. An equivalent advocacy position should exist for incoming graduate students to prevent isolation and familiarize them with the campus and the department Other activities that would be appropriate at the department level include establishing mechanisms to ensure accountability for affirmative action, devising recruitment and career development strategies for women and minority undergraduates, graduates, and faculty; and recognizing faculty involvement in affirmative action

Recommendation Six:
Establish affirmative action plans and the mechanisms to achieve them.

In cooperation with campus administrations, all academic departments should develop affirmative action plans. Such plans should include, wherever possible, specific goals for student and faculty diversity within a realistic time frame, curriculum goals where appropriate so that curriculum development begins to drive recruitment and hiring, recruitment and career advancement strategies for fulfilling those goals, and mechanisms for evaluating problem areas. For some disciplines (e.g., paleontology, oceanography, and endocrinology), so few minorities and women are currently being trained as to preclude setting firm target dates and numbers. But as the representation of women and minorities in these disciplines increases, as it surely will, faculty hiring goals should increase proportionately.

Recommendation Seven:
Develop recruitment and career advancement strategies for minority and women graduate students and faculty.

Affirmative action efforts tied to the expectations, perspectives, and needs of given disciplines can be undertaken most effectively in the academic departments. Deans and department chairs play a particularly significant role in developing strategies and mechanisms appropriate for their disciplines and departments and in mobilizing the faculty to participate actively in affirmative action efforts.

Recommended Action:

- **Develop recruitment strategies to improve diversity in departments and programs.**

Departments should make a concerted effort to recruit several women and minority graduate students each year. Over a period of years, such an approach would create a "critical mass" which would, in turn, provide the basis for a more welcoming and supportive departmental environment for incoming female and minority students and faculty. In addition to this approach, departments can promote diversity by making it clear, in job descriptions and expectations, that new faculty must be committed to achieving diversity. Departments can also begin to identify, among their own undergraduate and graduate students and among those from other departments in their discipline within the UC system, promising candidates for future recruitment into their graduate programs or faculty. The development of a Universitywide and intersegmental inventory of promising students, generated collaboratively within each discipline, could significantly advance student and faculty diversity in all disciplines.

- **Develop career advancement strategies for women and minority students and faculty.**

Departments can promote greater diversity by providing career advancement opportunities for their minority and women students and faculty. They can institutionalize this process in several ways. First, departments can offer both undergraduate and graduate training in research and other discipline-related skills, either sponsored by individual faculty or offered through summer apprenticeship programs. Consistent departmental and individual faculty support for professional development—e.g., in the areas of grant writing, publishing, and job-search skills—is also crucial. Effective orientation activities, professional development workshops, departmental and interdepartmental research colloquia, mutual assistance groups, and information dissemination are all important. Finally, departments need to foster a sense of community, of collegiality, such that their faculty members assume more consistent, sustained roles as mentors and sponsors for all students and new faculty, especially for underrepresented minorities and women.

Effective mentorship and professional opportunity programs already exist on every campus. Deans and department chairs have a responsibility to see that information on the opportunities available to students and faculty is properly disseminated. They should also assess the adequacy of available programs, and convey their findings to the Administration.

Because most new faculty, including members of minority groups and women, enter the academy with relatively little inside knowledge of the workings of the profession, departments should take steps to regularize the socialization of new faculty members, especially minority and women faculty, into the culture and professional dimension of the department and discipline. One way to accomplish this task is by introducing new faculty members to joint research or grant-writing projects with

tenured faculty members within the department. This is not always appropriate, however, and it must be appreciated that assistance proffered when not needed can be seen as patronage.

Recommendation Eight:
Recognize and reward faculty who devote time and effort to promote affirmative action.

Department chairs and faculty committees should establish departmental mechanisms that enable faculty to pursue affirmative action goals, with the knowledge that the time and effort involved will be respected and counted in tenure and promotion reviews (see "Faculty Action," Recommendation Twelve). Departments should provide incentives for faculty to serve as mentors to minority and women students and to undertake other activities which will increase the flow of these students into higher education and advanced studies. One strategy that departments might adopt is to collaborate with the campus administration and the Office of the President in securing supplemental research funding for faculty members who work with women and minority students as research assistants

A special comment is appropriate here. In view of the increasing demands and complexity of departmental administration, the chairmanship of a department rotates among the faculty more rapidly now than previously. For this reason, it is not uncommon for chairs to have little experience or in-depth knowledge of the UC academic personnel system. They may not be familiar with options or opportunities to optimize the chances for success of women and minorities. Given this situation, some form of training, guidance, or information resource should be made available to department chairs.

"My own success in life is due to the fact that I was lucky enough at the undergraduate and graduate levels to encounter instructors...who gave me the support, attention and encouragement that I have seen lacking in many other instances when faculty deal with minority students."

—excerpt from conference speech by Walter E. Massey

Recommendation Nine:
Initiate or expand departmental collaboration and contacts with other institutions of higher education.

Department chairs should work with campus administrators and the Office of the President to establish or increase contacts with sister campuses and other institutions, as a means to increase departmental diversity at graduate and faculty levels. They should also play a key role in securing greater faculty involvement in this endeavor.

Department chairs can have a considerable impact on the improvement of inter-institutional connections within each discipline. Through contact with other department chairs in their disciplines, they can improve communications with community colleges, the CSU system, and colleges that have historically served large numbers of minority students. This strategy should support faculty members in networking to identify a broader pool of potential minority and women graduate students and faculty within their disciplines

IV. Faculty Action

Faculty members are at the heart of the academic enterprise and are indispensable to affirmative action efforts at all levels

The faculty has a particularly significant role to play in identifying promising minority and women graduate students and faculty candidates and in bringing new minority and women faculty into the mainstream of departmental activities

Faculty members can advance diversity through greater participation in outreach and bridge programs, greater involvement as mentors to students and new faculty members, more active engagement in networking with colleagues in other institutions, and greater attention to informal support for women and minority faculty within their own departments

In order for faculty members to become actively engaged in affirmative action efforts, however, it is crucial that the University recognize and value their involvement The faculty, through the Academic Senate, can promote diversity by working to establish mechanisms for evaluating and rewarding such efforts

Recommendation Ten:
Assume greater responsibility for learning about affirmative action and for recruiting and mentoring women and minority graduate students and new faculty.

All faculty must become more informed about the crucial need for greater diversity within the University of California system Faculty must assume greater responsibility for educating themselves and each other about gender and ethnic issues pertinent to the University's broadening mission They should also seek a better understanding of the University's affirmative action policies and practices and of current conditions, both in the state and within the University system

Faculty members should become more aware of the complex ways in which gender and ethnic stereotypes manifest themselves in faculty-faculty, faculty-student, and faculty-staff interactions, perhaps through special training programs Department chairs in particular should receive special training and orientation in these areas since they influence departmental attitudes and standards

The perspectives that women and minorities bring to their departments may challenge assumptions and cause a shift in academic interests Established faculty members must be prepared to face such eventualities and must also be prepared to contribute to a support system that eliminates the sense of alienation that many of these students and new faculty are likely to experience.

The importance of informed, sensitive guidance cannot be over-emphasized In particular, established faculty members need to become educated about the sociological, psychological, and cultural factors that make the graduate and professional experience of women and minorities different from that of white males As mentors, faculty members should be keenly attentive to the different experiences, different approaches, and different needs that women and minorities bring to a department and to a discipline They must also be willing to offer appraisals of their student's or colleague's progress, even if doing so requires them to become familiar with a new field or new materials

At every level, faculty mentors should pass on key information about the conventions and dynamics of the academic department and discipline in which they are involved In the past, minority and female faculty have carried much of the load in guiding minority and female graduate students and in lending support to new minority and female faculty All faculty must now assume greater responsibility for this important task

All faculty members can advance recruitment efforts by pursuing their professional ties with colleagues. The contacts that faculty members have in their respective disciplines represent a vast national network which they can tap for recruiting minority and female graduate students and faculty In addition, faculty members can establish ties with minority communities close to their campuses

Recommendation Eleven:
Develop curricula responsive to society's increasing ethnic and cultural diversity.

To respond to a changing society and a changing academy, faculty members should evaluate whether curricula in their respective disciplines provide the tools for understanding cultural differences and properly address issues of diversity.

The options available to faculty for initiating curricular change include revising courses (e.g., changing them to ensure an appropriate focus on the contributions that women and minorities have made to their respective disciplines and to the social, economic, and cultural well-being of society) and ensuring that research on minority and women's issues within a discipline is recognized as a legitimate intellectual pursuit.

Recommendation Twelve:
Establish a joint Administration/ Academic Senate task force to examine the criteria used by campus committees on academic personnel for faculty evaluations.

In an era in which the achievement of diversity is central to the University's mission, faculty members involved in academic personnel reviews need to refocus their assessment strategies. This change in focus does not imply a relaxation of standards, rather, it recognizes that the faculty's affirmative action commitments and responsibilities are indispensable to the University and are of major importance in evaluating the merit of candidates for appointment, promotion, or tenure.

The faculty should foster and encourage affirmative action efforts at all levels and should acknowledge and reward effective participation in such efforts through the personnel process

Evaluation standards and procedures should be implemented such that the totality of a faculty member's contribution is considered and counted Therefore, the Academic Senate should join with Administration in charging a joint task force to evaluate the incentive and reward structure to ensure that faculty efforts to realize campus affirmative action goals are encouraged and given full recognition

Recommendation Thirteen:
Urge the Academic Senate to become a more active proponent of affirmative action goals.

The art of shared governance is finely tuned at the University of California due to long-standing tradition and mutual respect between the University administration and the faculty Academic Senate. With respect to affirmative action, however, the Academic Senate has not played a leadership role heretofore. The Senate, like the administration, can only influence graduate student admissions and faculty hiring indirectly. Nonetheless, there are ways in which Senate committees, notably campus committees on affirmative action, academic personnel, graduate councils, faculty welfare, and educational policy could be influential in enhancing affirmative action efforts This concluding recommendation urges that the Academic Council and each of the Divisions of the Academic Senate address the issues raised in this report to assess where the Senate can assist most effectively in achieving the goals of diversity

CONCLUSION

"This challenge to respond to the complex cultural and ethnic mix of our state also constitutes our greatest opportunity... "

—excerpt from conference speech by Regent Vilma Martinez

Since its inception, the University of California has sought to offer its students a superior education that is responsive to society's needs. Tomorrow's leaders will face unprecedented changes and challenges. To prepare them well and to ensure that they fully understand and represent the people of California, the University must meet the challenge of diversity, especially in its graduate student body and faculty, who are the vanguard of its intellectual endeavor.

In the proud tradition of the land-grant colleges and in keeping with President Gilman's vision of excellence and access, all members of the University community must rise to this challenge As Regent Martinez told the participants of the All-University Faculty Conference,

> "A great university is much more than a campus which provides a home to a group of professional schools The courses it chooses to offer, the people it chooses to employ and to teach, and the questions it chooses for research ultimately derive not exclusively from discussions in faculty meetings, but from society society's demands, its questions, its dreams The University is both the creation of and the intellectual force for the society in which it lives. A university flourishes as it examines and teaches the intellectual questions arising from the society of that time and place "

"The university is both the creation of and the intellectual force for the society in which it lives. A university flourishes as it examines and teaches the intellectual questions arising from the society of that time and place."

—excerpt from conference speech by Vilma Martinez

ALL-UNIVERSITY FACULTY CONFERENCE PARTICIPANTS

Pala Mesa Resort Hotel and Conference Center
Fallbrook, California

FEBRUARY 8 - 10, 1990

David Pierpont Gardner, President

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(UCI) Irvine	(UCLA) Los Angeles
(UCR) Riverside	(UCSB) Santa Barbara
(UCSC) Santa Cruz	(UCSD) San Diego
(UCSF) San Francisco	(UCOP) Office of the President

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All-University Faculty Conference List of Background and Position Papers

Background Papers

Introduction

California's Demographic Future and Implications for UC: Flow Models

Report on University Undergraduate Student Affirmative Action Programs

Report on Affirmative Action Programs for University Academic Employees and Graduate and Professional Students

The Targets of Opportunity for Diversity Program Strategy

Creating Hospitable Campus and Departmental Environments

Legal Background for Affirmative Action

Position Papers

Introduction. Diversity and Faculty Renewal

Faculty Roles in Recruiting and Retaining Graduate Students
Edmond J Keller, Lavelle Ure, and Karen Nelson, UCSB

Financial Support for Minority and Female Graduate Students
Douglas L Minnis, UCD, and Raymund A Paredes, UCLA

Mentorship and Support Services for Women and Minority Graduate Students
Richard P Duran and Paula S Rudolph, UCSB

Leadership As Active Commitment On the Campus Moving Beyond the Yellow Brick Road
Joyce B Justus, Sandria B Freitag, and L Leann Parker, UCOP

Faculty Affirmative Action at the College of Letters and Science, UCLA
Raymond L. Orbach, UCLA

The Retention of Women and People of Color Are We Asking the Right Questions?
Judy B Rosener, UCI

Some Random Reflections on Affirmative Action
Francisco J. Samaniego, UCD

The Faculty's Role in Affirmative Action Imperatives and Incentives
Karl S Pister, UCB

Academia, Climate Control and the Sense of Community
Margaret B Wilkerson, UCB

Appendix C: Duncan on Minority Students

NOTE The following material is reproduced from B L Duncan, "Minority Students," in Joseph Katz and Rodney T Hartnett (editors), *Scholars in the Making* Cambridge, Mass Ballinger, 1976, pp 227-242

Introduction

The perspicacious listener can hear more than the faint rumblings of discontent in the graduate minority student sector of the predominantly White university These rumblings are an unintended consequence and product of the "grand design" to lift the low levels of participation rates of racial and ethnic minorities There has been remarkably little systematic evidence generated on the minority graduate experience and training Most, or nearly all of the available data on graduate minority education are limited to summary statistics on numbers of admissions and funding to support claims of "success " Settling for inquiries at this level circumvents questions addressing the experiences of students and invite assumptions that a clear and direct relationship exist between certain "input" standards and desired outcome

Minority graduate students, demonstrably "different" from the mainstream White graduate culture as will be shown, represent *not* the traditional "input" into the graduate system and are erroneously thought or expected to experience the "throughput" or socialization process similar to their White counterparts, with the same end result. The administrator and professor, as will become evident, have not taken the time to gain enough understanding of the diverse cultural spectrum of minority graduate students. Their failure to accept a cultural difference perspective will be reflected in the data to be presented It will be shown that equality has not yet been achieved, and ethnic status greatly determines faculty-student relations and the learning process The view will be from the inside looking out, as experienced by the minority graduate student.

Methodology

A random sample of 550 students were selected from the total minority graduate student population of 1,490 at the University of California, Berkeley, and administered by mail an extensive survey (here referred to as the UCB Minority Survey) Eighty-eight percent of the sample responded. The resulting proportions from different ethnic backgrounds reflect favorably the total population distribution in the school (36 percent Black, 24 percent Mexican-American, 3 percent American Indian, and 37 percent Oriental) as well as sex (2 1 male-female ratio) Berkeley has one of the most innovative graduate minority programs in the country It was selected as one of the few campuses to receive graduate-level program grant support from the Office of Education of the Department of Health, Education and Welfare (HEW) with the specific objective of increasing the proportion of minority graduate students successfully completing graduate degrees by providing *supportive* services to graduate minority students currently seeking degrees on the campus The Demonstration Project that emerged from this funding had a variety of services A significant representation of incoming minority graduate students were selected to participate in an intensive six week faculty-directed study period These students were introduced to their respective departments, faculty, staff and facilities, advised of the requirements for a graduate degree within the departments, directed in reading, research, and/or areas of deficiency or weakness in preparation for beginning a graduate career Aside from the orientation component for incoming graduate students, continuing minority graduate students were invited to participate in individual-directed study, workshops in mathematics, statistics, research writing, reading, and teaching Throughout the year, more workshops were conducted in addition to a distinguished minority speaker series and individual tutorials running concurrent or preparatory to difficult courses Minority participation in research conferences and innovative minority content-oriented curriculum changes were stimulated

Although our sample was drawn from Berkeley students, it seems representative of minority students throughout the country At a recent (1974) Conference on Minority Education convened at the University of California at Berkeley attended by hundreds of university faculty and high-level administrators, the problems of Berkeley minority students were echoed many times over A baseline from which to interpret the Berkeley minority graduate student data was provided by the Wright Institute Survey, which was parallel n content to the Berkeley Minority Survey. The Wright sample was from four universities (including Berkeley) with 85 percent of the 700 respondents White

Peer relationships

Graduate minority students are an isolated group Data from the Wright Institute and UCB Minority Surveys provide strong evidence for this assertion Nearly 65 percent of the minority students report "rarely or never" socializing with other graduate students in their department compared to a relatively small (15 percent) percentage of Whites Asian-Americans reported the most social distance (68 percent) and Blacks the least (59 percent)

It is understandable that incongruences and different need patterns might limit the desire for intergroup socializing However, responses by minority students about how much they engage in social dialogue about their field, other intellectual interests, and non-academic matters with other graduate students in their department show the same results. Four times as many minority students reported that they engage "rarely or never" in this kind of intergroup interaction These results are not easily explainable by saying that the needs of minority students are different, but suggest a generalized insularity that generates interpersonal stress by denying satisfaction of social needs and normal social processes The minority student also is provided fewer opportunities for social comparison within the context of his other peers One important component of social interaction is evaluative feedback or "reflected self-appraisals." The impairment of this process can make it difficult to develop and maintain a realistic conception of competencies and liabilities, strengths, and weaknesses.

If the level of interaction is so infrequent and superficial as is indicated by the data, the minority student will not even have exposure to the subtle cues that are given off in impersonal interaction that carry much informational value Such contact is important for all students, if only to provide reassurance or dispel doubts Evaluative feedback from professors is not always forthcoming and when it does is often filled with ambiguity Both the minority and nonminority graduate student will look elsewhere for confirmation that "all is well " The general low levels of reported self-confidence of both minority and nonminority samples (over two-thirds of both report only "occasionally," or less often feeling self-confident) coupled with the relatively limited professorial feedback (over half of both samples report "little" or "almost none") suggests that peers could serve as surrogate teachers providing feedback that would bolster morale and confidence

Morale as indicated by student responses to questions of how often they felt "lonely," "depressed," "close to tears" is a significant problem in graduate education The minority students felt these feelings much more frequently than nonminorities But if, indeed, the aphorism that "misery loves company" is correct, the minority graduate student is bereft of such, and must seek comfort among those who cannot provide direct feedback on professional and educational abilities (like family and friends outside the university walls) They must be content to be assured of their self-worth and capabilities in general terms, most times unrelated to academic ability where it is needed What of the incoming graduate minority student? If he is cut off from informal channels of communication with fellow students, the adjustment must be very difficult. Evidence of the high attrition among minorities during the first year (Duncan, 1976) may be in part attributed to the inability of the White departmental community, particularly peers, to form a support network that provided for integration These are "rules of the game" that are integral to ensuring survival They are learned not from catalogues, professors, or administrators but from peers White students who have often learned the game so well are at an advantage and appear unwilling, for whatever reasons, to share this skill Perhaps it can in part be explained by the competitiveness of American culture or "backlash" resulting from special admission

and financial aid programs for minority graduate students

The minority student is further disadvantaged by being shut off from other informal learning opportunities, such as small study groups, which are an aid for in-class discussions and preparation for examinations. One minority student described the typical seminar setting as "one in which you have the script, the assignment, but feel less prepared and out of step with the action because you have missed several rehearsals." Because the small seminar is a frequent vehicle for graduate instruction, a lack of extension from "outside" interaction to the seminar room exacerbates the feeling of isolation. Often the minority students react to this situation by withdrawal, and learning is made more difficult. There is further chance that the nonminority student will interpret the fear that might be felt by the minority student and reluctance to "enter the fray" as evidence that the minority student can't compete, needs remediation, or just doesn't belong. The professor might make similar attributions for such "silent" behavior.

Responses to the open-ended question "How well do you feel you fit in your department? Do you feel you are one of the group or sort of on the fringes?" add support to the extent of perceived departmental isolation. Three out of five minority students answered that they were "indeed on the fringes and do not fit well" in their department. In their further comments, they described situations of indifference, coldness, hostility, and even contempt.

Minority students feeling on the fringes of the department might be thought to be able to turn to each other for support and achieve increased group cohesiveness and a higher level of cooperation. Available data do not support this hypothesis. When asked how many close friends they have among other graduate students in their department, 44 percent of the minority students reported "none" compared to 11 percent of the Whites. It should not be surprising that intragroup closeness is diffused by the graduate experience. In response to an open-ended question of how they "fit in the department," minority students commented that their minority peers are so busy working that they seldom see each other, or that White students and faculty engage in a kind of divisiveness that pits them against each other for social and academic favors.

There are many differences among people in the same ethnic group. They are not "all alike." As the predominantly White campus reaches out through recruiting efforts to the ghetto and burrio hinterlands to satisfy "quotas," they bring together minorities that have very disparate backgrounds within their own culture. Support networks are not a "given" because the race or ethnic origin is the same. For example, the political climate, particularly among Blacks, has served a separating function. The various movements, Muslim, NAACP, Black Panther, and so forth, fragmented a unifying ideal. Much of this, however, is now over, and a deeper sense of group purpose is evident. One student's comment about another student says what we are trying to convey: "Although we are the same color, our backgrounds and approach to life are so different. Don't get me wrong. I don't dislike him or his middle-class orientation, we are just at very different places. Sometimes he seems as White in behavior as they are."

It could be that the academic environment engenders a threat to survival and an acute competitiveness that obviates the potential for close relationships of any kind. Minority students viewed their relationships as "mostly competitive" or "somewhat competitive" twice as often as White students (78 percent versus 38 percent) when asked whether graduate students in their department tend toward being competitive or cooperative. Blacks viewed relationships as more competitive than other minority groups. Somewhat paradoxically, the Asian-Americans did not report as much competitiveness, although more so than Whites. If competition is inconsistent with the Asian-Americans world view, it might be expected that they would experience it more acutely. But, perhaps they are more willing to see others as they would like them to see them or as they would like them to be. The competitive climate as perceived by minority graduate students is further revealed in their asserting that "most white students tend to cluster together and block the minority student's progress. The minority student must find a hole in their armor."

What reasons do the minority students offer for feeling on the fringes of the department? They say that the department is the essence of WASP America and they are not of White America. They say that the traditional nature of the departments is a problem because the departments are inflexible and main-

tain certain norms and values and appear to be threatened by the minority students' desires for different types of training Other students mention racist backlash from professors, administrators, and students that forces them to the boundaries of their department

If the quality and quantity of peer interaction within the department is so unsatisfactory, minority graduate students can be expected to seek alternative companionship elsewhere Their response to how much time they spend with people unaffiliated with the university during the school year (other than family) suggests that notion Approximately 32 percent of the White sample replied that they spend "very much" or "much" of time with people *outside* of the university compared to 53 percent of the minority students When dropping the third of the minority students that are married from the analysis, the percentage increases to 66 percent Does this mean that the campus environment is unsuitable to their social needs? It appears as though graduate minority students are not integrated into any aspect of campus life, least of all their department It is as if they were forced to seek refuge from what they perceived as a socially uninhabitable and generally hostile environment It is not surprising that they feel alone in a community of strangers, or better yet, competitors Even if minority students were desirous of opportunities for active intellectual exchanges with their peers, both social and physical distance would preclude such an engagement Minority students are forced to create a campus atmosphere for themselves or suffer in silence for there are many deaf ears around the university

Faculty relationships

In the eye of the graduate minority students, their professors are unfair, indifferent, unaccepting, manipulative, aloof, paternalistic elitist, pompous, sanctimonious, racist, and insolent (White and minority students agree to the extent that *both* think that professors are indifferent and aloof) When asked "What kind of relationship do you have with your professors and what do you think of them as people?" four out of five minority students were uncomplimentary in their response Chicanos, Blacks, and native Americans particularly resented being viewed as less than adequate students and in need of remediation The Asian-American commented on being treated distantly and coldly and as outsiders who had to be tolerated The minority graduate students in general felt it unfair to be put in the position of having to prove themselves before they are accepted, unlike the White students who, they think, are accepted without first having to prove themselves Some of the responses were not so vituperative, but the negative ring is unmistakable "I respect my professors, but I resent their elitism My professors don't know how to treat low-income minority students because we are new It's only until recently that low-income minority students have been pursuing graduate studies and my department still hasn't adjusted My professors have not learned how to separate their title from the human side of them " Another comment went "I don't really think of them 'as people' in the sense you seem to imply here I don't want to be friends or 'equals' with them, but to be graded fairly and taught well, with politeness and professionalism in the relationship When I first started school, I was greatly in awe of my professors, I am no longer They have the same prejudices and emotion as other people in our society, they are just as sexist and racist "

The professor is often the focal point of graduate students' criticism, not by minorities alone They are accused of having their own system, playing their own game, pursuing research for their own advancement rather than a search for truth, preferring fame through publication more than teaching, and so on Are there, however, amidst these criticisms, differences in the way professors treat minorities as compared to nonminorities? The students were asked "Has any professor really taken you in hand and helped you become a professional in you field? While one out of four White students answered "yes," just one out of 20 minority students did so Does this represent a lack of concern for minorities? It has been said often enough that once the minority student is admitted, they become invisible Responding to various motivations, both intrinsic and extrinsic, the marginally prepared minority student often is granted access and then left to flounder He or she is either "pushed out," granted some terminal degree short of the objective, or leaves under coercion and is made to feel that the choice was his or her own, with a chorus of faculty voices chanting "We did our best."

These students' failure was a reality before they began -- a perverse kind of self-fulfilling prophesy While it is laudable for minority students to be admitted under special criteria, the faculty is severely derelict in not assuming responsibility for minority student Attrition data of graduate minorities are not available nor is their collection contemplated It may not be expedient to look at the backdoor Reinforcements for administrators and faculty come through the front door Minority students' responses to the open-ended question "Can you give me an idea why some graduate minority students who started out with your department dropped out?" give some sense of the magnitude of the problem Little faculty support emotionally or intellectually accounted for 39 percent of the reasons offered. Inability to cope with external pressures (18 percent), deterioration of self-esteem allowing other insecurities to surface (17 percent), lack of self-confidence (11 percent), the political and ideological atmosphere engendered by professors who are racially antagonistic and oppressive (9 percent), and a sense of failure (4 percent) were the other significant response categories

There is further evidence that minority students might indeed be the recipients of differential treatment by professors. They report receiving written feedback about as often as Whites but *oral* comments significantly less frequently What would account for this faculty preference? Was the student, quoted earlier, right in saying that the professors do not know how to talk or relate to minorities? Does the minority student suffer by the lack of oral evaluative feedback? Verbal statements from professors explicitly giving their perceptions, reactions, evaluations are less likely to be ambiguous and could serve students well for their self-evaluation However, if the oral feedback is not a frank appraisal it can be dangerous It is possible that the professor is incapable of a face-to-face confrontation or dialogue with minorities because of lack of cross-cultural experiences or benign predispositions This verbal reticence penalizes the minority student, and the written comments do not compensate for it

As with their departmental fellow students, minority students spend less time than Whites with their professors In answer to the question of how much time they spend in social and recreational activities with professors, one in 50 report, "very often" or "often" while one in 16 Whites say so And while close to two-fifths of White students "occasionally" socialize with professors, less than one-eighth of minorities do Similar to the data about the oral versus written feedback is the report by minority students that they have fewer opportunities to speak with professors about their field, other intellectual interest, and nonacademic matters Contact with faculty members in any substantive manner is at a premium. It must be said that Asian-Americans have far more faculty contacts than other minority graduate students The Asian-American students appear to have their most significant problems in the economic, social, and language areas

If the feedback minority students receive from professors is infrequent, might it not because of its scarcity be more highly valued when it does occur? In fact, minority students value the feedback less than White students whose interaction on all levels was twice that of minorities This obverse relationship might be a boomerang effect manifesting a derogation of the value of the feedback that is more rarely given A further boomerang reaction might be a derogation of the professors' opinions or views expressed by strongly disagreeing with them. This hypothesis was confirmed. Frequent silent disagreement was 42 percent compared to 24 percent by Whites

The minority student does not feel that he is treated in an egalitarian fashion by professors One-half of the minority students felt that they "rarely" or "never" were treated as an equal compared to one-fourth of the White students

The preceding data on professor-minority student interaction suggest that the minority student is missing an important part of the socialization process that facilitates professional training the isolation can interfere with the acquisition of skills, dispositions, and values that contribute to the ability to learn one's professional role The professor must take a more active role in the process by taking the initiative and encouraging minority students Only about one of nine minority students felt their professors have "very often" or "often" inspired them to do better work," while four of nine White students report such inspiration

A roundabout route can be taken to the question of socialization from the vantage point of what the minority student thinks the professor is looking for in

a graduate student These expectations are important because they constitute some of the behavioral baggage the minority student must carry with him if he hopes to be successful in completing the initial lap of the track Minority student responses indicate that sociodemographic rather than academic variables are more important -- that is, whether one is White and upper or middle class, rather than whether one has initiative, intelligence, creativity

The minority professor remains a scarce and much needed commodity Over 93 percent of both Whites and minority graduate students report having been taught less than two graduate courses by a minority professor Nearly 70 percent report "never" having had a graduate course taught by a minority professor. The mainstream of graduate education desperately needs the contribution of the minority professor. The future in this regard looks bleak More and more young minority Ph D s, serious about their research, find the university setting an impossible one in which to be productive They are beginning to set up offices in the community, particularly the behavioral and social scientists are doing so Others, particularly Blacks, are being recruited to predominantly Black colleges The lack of minority faculty is a very serious drawback that prevents nonacademic supportive relationships between minority faculty and minority students The minority faculty member is so harassed by "window dressing" committees, heavy teaching loads, publication pressures, and so on that availability for minority graduate students is slight To the student he or she is there, but isn't. Administrators do not see the need to "protect" the minority faculty member The only protection that occurs is from the student

Treatment, training, and prejudice

Minority graduate students are not only unhappy but despondent about their graduate programs While only one in nine White students checked "revamp the whole thing" in response to how much change they desired in their department's way of *treating* them, one of every two minorities endorsed this extreme position The *training* of graduate students should also be completely revamped said one in three minority students compared to just one in eight White students Students cannot look kindly on a social milieu in which their aspirations, expectations, sense of competence, and self-esteem is systematically lowered, actively by discouragement and passively by absence of support and encouragement When asked in open-ended question form "Are there changes you would like to see made in the way your department trains and treats graduate minority students?" we hear the clarion call for change· Accept more minority students and treat the ones you have as equals Acknowledge their unique abilities and potential for contributions Stop being condescending Treat them as human beings with real needs, thoughts, and minds.

The severity of adjustment for the minority students is seen in how often they have felt that they "did not want to continue in their field" and "how often during the school year they considered quitting graduate school and for what reasons " Thirty-eight percent of the minority students considered quitting "daily" or a "couple of times a week" compared to 13 percent of the Whites There were similar responses to the question about thoughts of not continuing in their field Lack of encouragement from professors and financial pressures predominated among minority students' reasons for considering quitting. The distribution of reasons were different for White students General uncertainty about future and goals and feeling a lack of progress provided the White student's central reasons for contemplating leaving

The affective experience has been just as dramatic for minority students Minority students twice as often felt less self-confident, joyful, happy, and buoyant compared to White students, and they felt to a similar degree uneasy, anxious, lonely, and very depressed Minority students were asked what in their life had suffered or benefited by their being in graduate school Two of three chose to respond to what they had suffered Although slightly under a quarter (23 percent) of the sample mentioned their loss in family relationships and economic well-being, a higher percentage responded poignantly that their self-esteem (27 percent) and coping ability (29 percent) had been diminished by the experience Loss in self-respect, intellectual confidence, assertiveness, and self-control were cited, but less frequently

A correlation of such variables as age, year graduated from college and year graduate school was started, marital situation, number of children, and salary expectations strongly suggests that a significant

number of minority graduate students (as many as 65 percent), particularly Blacks and Chicanos, are returning to academia after considerable disappointment in the business world They are the children of some of the empty affirmative action programs of companies interested only in swelling minority numbers These companies lured the baccalaureate degree minority students with more money than they had ever imagined, but put them in pigeonhole jobs. After several years of such complacency and finding out about the limitations of their degrees for advancement, they returned to school It is clear that they were not ready for what they were to experience Further, there was not a paycheck every week to ease the adjustment

Yet in spite of seemingly insurmountable obstacles, the degree of commitment is remarkable Twice as many minority students than Whites reported an increase in commitment Only 8 percent of the minority graduate students reported themselves less committed as compared to 29 percent of the Whites The hardship apparently does not interfere with commitment Unfortunately commitment alone cannot always carry the day

Have the minority students observed any outright prejudice or discrimination toward them or fellow minority students? The answer is a resounding "yes." There is an interesting disparity, however, in the perceptions of White and minority students on this question. Four of five White students responded that discrimination "rarely or never" takes place, while only one of seven minority students agreed that there is so little discrimination Two of five minority students who were in a position to observe felt ethnic prejudice was shown by other students "often" while fewer than 3 percent of White students reported such frequency Similarly, faculty were seen by about two-thirds of minority students to be "often" prejudiced toward ethnic minority students, while only 4 percent of White students saw that much prejudice. Again, about one out of seven of minority students and about four of five White students saw prejudice "rarely or never" directed at minority students by faculty In stark contrast, there were no significant differences between White and minority students in how often they observed prejudice toward White students by other students and by faculty

The minority students also reported more prejudice directed toward themselves individually by other students (two of five "often," two of three "occasionally") than Whites (less than 1 percent "often," one of nine "occasionally") They also reported more prejudice by professors (two of three "often" or "occasionally") than Whites (one of six "often" or "occasionally") From the evidence, prejudice toward minorities is felt keenly by the Third World people Even if one were to argue that minority students have a differential threshold for labeling a behavior as prejudiced or discriminatory, these data indicate a degree of felt discrimination that merits much more attention than it has received

Financial assistance and departmental influence

The goal of integrating graduate minority students into the university clearly has not been achieved in many areas Consider financial assistance Less than 4 percent of the teaching and research assistantships are held by minorities other than Asians (Collins, 1974) There are, of course, logical explanations for this There is an educational gap between the majority populations and the more disadvantaged minority groups Minority students are concentrated in those fields (nonscience professional schools and social science) with small numbers of available assistantships But these are not the only factors At a time of shrinking budgets, minority students are bypassed for assistantships because it is reasoned that the minority student can get money elsewhere from special funds. What is not understood or ignored is that the education of minority students is adversely affected when they are kept out of the assistantship positions Nine out of ten minority respondents indicated that they had no experience teaching at the college level compared to less than four out of ten Whites Surprisingly, not as many Asian-American students are given TA- or RA-ships as might be expected (6 6 percent) Although language might be a problem, it is not sufficient to explain the exclusion It only increases their economic hardships

Minority students, although expressing desires for more change in their departments, responded more timidly, or realistically, than White students to the question of student influence over departmental policy and requirements The minority students felt "little" or "no" student power in affecting

change through formal or informal means The White students were considerably more optimistic There is an apolitical air or a conscious effort to maintain a non-confronting profile on the part of minorities But there is also a frightening sense of helplessness. Minority students stressed more often than Whites the need to ingratiate oneself with one's professors in order to succeed Twenty-nine percent of the Whites felt this was "very" or "quite" important compared to 54 percent of the minorities This uncharacteristic response is not compatible with the rhetoric of many minority students. It is difficult to explain Has the minority student acceded to the pressures when gaining admission? Are the minority students unwilling to jeopardize their status or do they have some jaundiced "insight" into how one endures in the system?

Conclusion

What sociodemographically is different about the growing numbers of graduate minority students on the campus? More come from a lower socioeconomic status One in three of minority and one in 12 of White students state that their mother had less than a high school education, and one in three minorities state their fathers had a similarly low level of education, compared to one in nine of the White students There is a tendency for minority to lack adequate funds -- nearly a half report them "pretty" inadequate or "very inadequate" -- compared to Whites (slightly less than a fourth) There may also be a tendency for more minority students to be working. The number having a "paid job within their field" is one in five for minority and one in seven for White. The minority student seems to be working more on "someone else's research or scholarly activity" (close to two in four minority, one in four Whites) Money worries and having to work on someone else's project might contribute to the problems already spelled out.

There are some troubling and puzzling features in the data. Minority graduate students engage in less community activity (61 percent of the White students report "never", 76 percent of the minority students) This casts an unfavorable light on the sensitivity of the curriculum as it interfaces with real world concerns Is there not enough time "left over" for application of learning? Minorities, through some overt or covert processes, are being kept from their community There is irony in this because it disturbs the dream of the "return to the community " The minority graduate student is not even clear about his or her personal goals Sixty-two percent of the White graduate students report being "very clear" or "clear" about personal goals versus 37 percent of the minority sample.

The minority graduate student anticipates a higher salary than his or her White counterpart (29 percent of the White sample expects $15,000 or more; well over half of the minority sample expect this much just after finishing their training) The higher salary expectation might, in part, be a function of a different mix in majors of the two samples (professional school students expect more money). Another possibility is the salary "conditioning" by previous employment As was pointed out earlier, many minority students return to school after unhappy but well-paid work experiences

Do all these data mean that the minority graduate student is turned off to minority problems? Is it correct to say that graduate education requires, even demands a cultural purge to some degree? There are not a lot of jobs at the salary expected by minorities in community-related undertakings or even in the university as junior faculty (few report wanting to teach or do research) Fewer minorities than Whites indicate the importance of "helping other people" or "seeing my work have a lot of impact " What appeared to be more important was upward mobility, for example, high income, recognition, and so forth Not even social or political change was given a higher response To what are we to attribute these discontinuities? The answers must be found because the future leadership and plight of minorities might hang in the balance Our data should compel university faculty and administrators to reevaluate the past and reorder present priorities A long painful look at graduate minority education cannot be avoided

CALIFORNIA POSTSECONDARY EDUCATION COMMISSION

THE California Postsecondary Education Commission is a citizen board established in 1974 by the Legislature and Governor to coordinate the efforts of California's colleges and universities and to provide independent, non-partisan policy analysis and recommendations to the Governor and Legislature

Members of the Commission

The Commission consists of 17 members Nine represent the general public, with three each appointed for six-year terms by the Governor, the Senate Rules Committee, and the Speaker of the Assembly Six others represent the major segments of postsecondary education in California Two student members are appointed by the Governor

As of September 1993, the Commissioners representing the general public are

Henry Der, San Francisco, *Chair*
C Thomas Dean, Long Beach, *Vice Chair*
Mim Andelson, Los Angeles
Helen Z Hansen, Long Beach
Lowell J Paige, El Macero
Guillermo Rodriguez, Jr , San Francisco
Stephen P Teale, M D , Modesto
Melinda G Wilson, Torrance
Linda J Wong, Los Angeles

Representatives of the segments are

Alice J Gonzales, Rocklin, appointed by the Regents of the University of California,

Yvonne W Larsen, San Diego, appointed by the California State Board of Education,

Timothy P Haidinger, Rancho Santa Fe, appointed by the Board of Governors of the California Community Colleges,

Ted J Saenger, San Francisco, appointed by the Trustees of the California State University,

Kyhl M Smeby, Pasadena, appointed by the Governor to represent California's independent colleges and universities, and

Harry Wugalter, Ventura, appointed by the Council for Private Postsecondary and Vocational Education

The student representatives are

Christopher A Lowe, Placentia
Beverly A Sandeen, Costa Mesa

Functions of the Commission

The Commission is charged by the Legislature and Governor to "assure the effective utilization of public postsecondary education resources, thereby eliminating waste and unnecessary duplication, and to promote diversity, innovation, and responsiveness to student and societal needs "

To this end, the Commission conducts independent reviews of matters affecting the 2,600 institutions of postsecondary education in California, including community colleges, four-year colleges, universities, and professional and occupational schools

As an advisory body to the Legislature and Governor, the Commission does not govern or administer any institutions, nor does it approve, authorize, or accredit any of them Instead, it performs its specific duties of planning, evaluation, and coordination by cooperating with other State agencies and non-governmental groups that perform those other governing, administrative, and assessment functions

Operation of the Commission

The Commission holds regular meetings throughout the year at which it debates and takes action on staff studies and takes positions on proposed legislation affecting education beyond the high school in California By law, its meetings are open to the public Requests to speak at a meeting may be made by writing the Commission in advance or by submitting a request before the start of the meeting

The Commission's day-to-day work is carried out by its staff in Sacramento, under the guidance of its executive director, Warren Halsey Fox, Ph D , who is appointed by the Commission

Further information about the Commission and its publications may be obtained from the Commission offices at 1303 J Street, Suite 500, Sacramento, California 98514-2938, telephone (916) 445-7933

SHORTENING TIME TO THE DOCTORAL DEGREE

California Postsecondary Education Commission Report 90-29

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